RABBITS
FOR FUR & FLESH

C. J. DAVIES

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RABBITS FOR FUR AND FLESH

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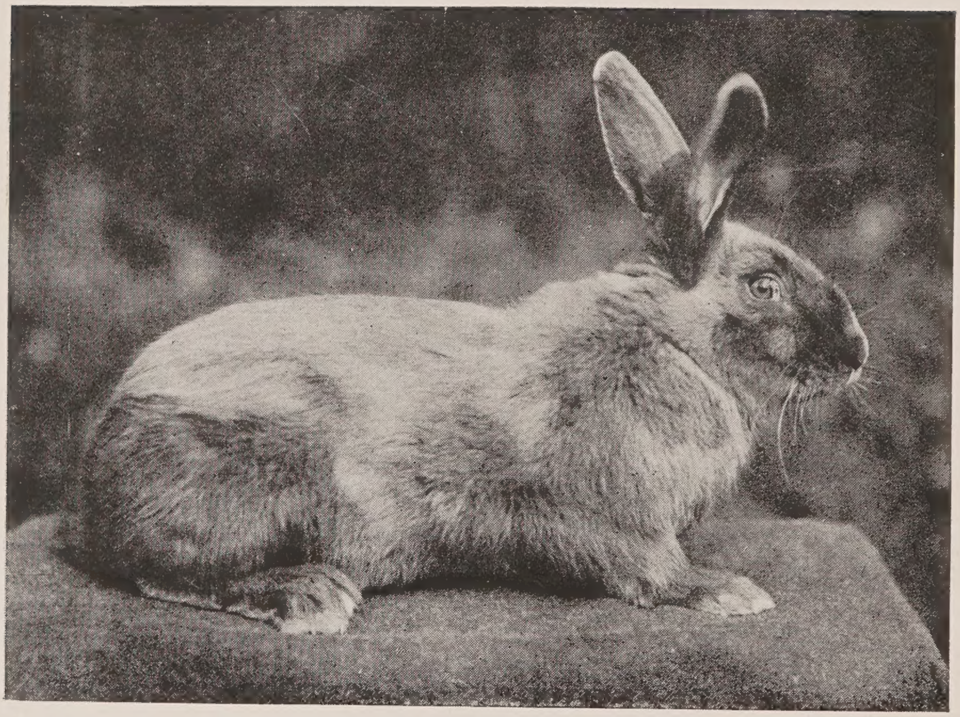

BLUE BEVEREN BUCK.
(A grandson of imported rabbits.)

Frontispiece

RABBITS FOR FUR AND FLESH

BY

C. J. DAVIES

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RABBITS FOR FUR AND FLESH

CHAPTER I

ORIGIN AND VARIETIES OF RABBIT

Domestic rabbits are descended from *Lepus cuniculus*, the Wild Rabbit, which is believed to have been indigenous to South-Western Europe and was introduced into the British Isles either in the time of Cæsar or, according to another authority, not until nearly the end of the twelfth century. In 1309 rabbits were still so rare that they were of the same value as pigs; and even in the reign of Henry VIII rabbit fur was valued very highly, and was worn by the nobles.

A wild rabbit has 7 cervical, 12 dorsal, 7 lumbar, 4 sacral, and 13–15 caudal vertebræ, weighs from 2½ to 3 lbs., and is, on an average, of the following external dimensions:

Length of head and body	about .	16½	inches
,, tail	,, .	3	,,
,, head	,, .	4½	,,
,, ear	,, .	3¼	,,
Girth behind shoulders	,, .	9	,,
Height at shoulders	,, .	6½	,,
,, rump	,, .	8	,,
Length from heel to end of claws		4¼	,,

Fancy rabbits can be roughly divided into three fairly well-defined classes:

(1) Small varieties of an adult weight of about 2½ to 3 lbs., or about the size of their wild ancestor.

(2) Medium-sized varieties of double this weight, which grow at the rate of about ½ oz. daily.

(3) Large varieties of at least double the weight of the medium-sized breeds, which grow at the rate of not less than 1 oz. daily. There is probably a rare fourth class, individuals of which grow at double the rate of class 3.

On the Continent the utility points of rabbits are the first consideration, and as good carcases and large pelts are of greater economic value than small ones, no varieties are seriously considered unless they belong to the medium or large-sized breeds.

VARIETIES BRED CHIEFLY FOR THEIR FLESH

FLEMISH GIANT

The origin of this breed is obscure, but rabbits of the type have been known on the Continent for nearly four hundred years under various names, such as Large Belgian, Patagonian, Andalusian rabbit.

The chief characteristics of the breed are its enormous size and great weight. The minimum standard weights for exhibition steel grey specimens in England are 11 lbs. for bucks, 13 lbs. for does; but it is not uncommon for these weights to be exceeded by prize specimens shown very fat. In England rabbits of a steel grey colour only are considered typical; but on the Continent breeders recognise:

1. Hare red with white belly.
2. Rabbit grey with white belly.

Secondary colours:

3. Iron grey with dark belly.
4. Self blue.
5. Self black.

and value them in the order given.

By far the largest rabbits are of a hare-red colour, and in comparison with these the steel greys, so much admired in England and Germany, are small and degenerate.

In weight classes held many years ago at Ghent Show, which was the centre of the district most celebrated for the breed, the premier awards went to hare-coloured giants, one famous buck weighing about 19 lbs. and a doe over 21 lbs. (8 kg. 500, and 9 kg. 500).

These weights have apparently been exceeded in recent years, however, for in a French book, published in 1910, there are illustrated and described two hare-red Flemish Giants, the buck reputed to weigh over 24 lbs. (11 kg.) and the doe about 28 lbs. (12 kg. 500) when only 10 months old. These weights are, of course, exceptional, and average Continental weights for the white-bellied types are given as 16 to 18 lbs. for males, 18 to 20 lbs. for females. The heaviest weight recorded in England up to the present time is a doe of 22½ lb.

The following description applies to the type of rabbit liked in France:

General Appearance.—The Flemish Giant is long, large, flat of back, and squarely built. Pure-bred animals attain a length of 36 inches to 39 inches, sometimes 40 inches, measured, when stretched out, from tip of nose to root of tail.

Head.—Strong in the male, but not bent as in a Lop.

Eyes.—Large and dark and not showing haw.

Ears.—Large, straight, carried forward, and in the form of a V, with round, spoon-shaped tips.

Feet and Legs.—Feet large, legs strong and straight, but not long.

Neck and Body.—A slight dewlap in bucks is the most allowed; it is large, flat, and uniform in does. Back long, broad, and flat; croup nicely rounded and not abruptly finished.

Thighs.—Tightly attached to the body.

Coat.—Short and fine.

Disposition.—Lethargic.

Special faults.—Ears pendant or with tips turned over. White marks, or feet barred with black or white. Coat long and woolly. Bent legs, angular back, crooked tail. Irregular dewlap. A lesser weight than about 11 lbs. A colour tending to uniform yellow or to too dark a grey.

FRENCH SCALE OF POINTS

General appearance, size	20
Length	15
Breadth	15
Ears	10
Feet	10
Head	5
Dewlap	5
Coat	5
Colour	10
Condition	5
	100

ENGLISH SCALE OF POINTS

Size and weight	30
Colour	20
Shape (including dewlap)	15
Legs and feet	15
Head and ears	10
Condition	10
	100

The great value of the Flemish Giant lies in its capacity for increasing the size of the breeds with which it is crossed, and for that purpose it cannot be bred too large or kept too pure. On the Continent it has the reputation of being not very hardy and of yielding a flesh which is stringy and far from delicate in taste. The does lose flesh and quickly become exhausted if bred from freely. To this may be added the English experience of unprolificacy in the steel greys and the fact that the young mature slowly and yield a very large proportion of offal. Young Flemish Giants do not become firm in flesh and fully moulted until over 6 months old, and are not mature until a year old. It is advisable to breed from the does for the first time when between 6 and 9 months old. The proportion of offal has been given as follows: 6 months, 40%; under 6 months, 42%. Specimens killed immature at 10 or 12 weeks old often give a dressed carcase which represents but from 50% to 55% of the liveweight.

The skins of this breed are not fully "set" or of best quality until the animals are at least 8 months old.

The breeder who can provide large hutches (at least 5 feet long) and a great quantity of green stuff and hay at a nominal cost will probably find the breeding of pure Flemish Giants for stock purposes a remunerative undertaking, especially if attention is paid to securing a strain of exceptional size and prolificacy rather than of a certain colour. Ordinary pure-bred specimens usually fetch about

1/– per lb. liveweight, and there is a better sale for bucks for crossing purposes than in any other breed.

French breeders state that it is necessary to breed the hare-red and rabbit-grey types concurrently, and resort freely to crosses between the two, otherwise the former degenerate into a "dirty yellow" colour, and the latter lose size.

Normandy Giant

This variety has been evolved from crosses of the Flemish Giant with carefully selected farm rabbits of Normandy. It is claimed for the Normandy Giant that it is much hardier and makes a much more rapid growth than the Flemish Giant. The back is shorter and wider and is arched instead of flat. The thighs are more closely attached to the body, and the bone is finer and more solid. The does are very prolific, and the young, if well fed, give a 5 lb. dressed carcase at 4½ months old. The flesh is of excellent quality, and the proportion of offal lower than in the Flemish Giant.

General Appearance.—Something like the Flemish Giant, but inferior in size, length, and weight. It is more massive and broad, and of more regular proportions. In disposition it is lively and virile.

Head.—Short, broad, and slightly bent.

Ears.—Well set on, straight and upright, not large and long.

Legs.—Short and strong.

Neck and Back.—Dewlap absent in male, very slight in female. Back very broad and well developed, well arched.

Coat.—Short, fine, and bright.

Colour.—Grey, tending to a reddish hue.

Weight.—10 lbs. to 13 lbs. Less than 9 lbs. adult weight is a serious fault. The Normandy farm rabbit weighs from 5 lbs. to 7 lbs.

The chief faults are those derived from too great a preponderance of Flemish Giant characteristics, such as a flat back, heavy, round-tipped ears, exaggerated dewlap, etc.

FRENCH SCALE OF POINTS

Type	20	Weight	30
Ears	10	Condition	5
Coat	5		
Colour	30		100

This breed is the most esteemed table rabbit in France, and its excellence has led to the creation of several other varieties, such as the Picardy Giant, of very much the same type.

It would no doubt be possible to produce a similar breed in this country by crossing large Flemish Giant bucks with very carefully selected common cottager's rabbits, chosen for their broad, short backs, and preferably of a whole or self colour. By selection and inbreeding a race of the desired type could soon be established.

BELGIAN HARE

Contrary to the opinion which used to be held by certain writers both in France and England, this breed is not of hybrid origin, but is merely a descendant of the wild rabbit, bred by selection with as many as possible of the characteristics of a hare. Although a good modern Belgian Hare bears a strong superficial resemblance to a hare, a close examination and comparison of the coat alone will at once reveal differences which stamp the fancier's production as an undoubted rabbit. It is probable that the hare-coloured Flemish Giant figures in the back part of the pedigree of the Belgian Hare ; but in England, if not elsewhere, selection for fineness of bone and elegance of shape have diminished the size, weight, and utility qualities of most of the specimens of exhibition strains.

General Appearance.—A typical Belgian Hare is very long everywhere—back, head, ears, and legs.

Head.—Long and narrow.

Eyes.—Large and brown.

Ears.—Carried upright, 5 to 6 inches in length, and with well-marked black tips (ear lacing).

Feet and Legs.—Very long, fine in bone and red in colour.

Neck and Body.—No dewlap. Back very long, nicely arched, the body extremely narrow and slab-sided.

Disposition.—Varies ; but the breed is not as a rule either lively or intelligent.

Weight.—About 8 lbs. ; but many of the best modern exhibition specimens are less than this.

Coat.—Short, fine, and of a hare-red colour well covered with wavy ticking.

Pedigree Belgian Hares are reputed to give a very hard stringy flesh and a poor quality fur; modern English exhibition strains are totally lacking in utility qualities. They have no framework or back upon which to carry flesh, they have in many cases no natural aptitude to fatten easily, their short coats are of no value for fur purposes, and their long legs are of no economic value.

Utility strains, bred with good backs and short legs, are a more promising material for the breeder of table rabbits. Many people claim that the Flemish Giant–Belgian Hare crossbred is unequalled for table purposes. They are probably better than either pure parent breed as bred in this country, but inferior in almost every respect to many of the Continental pure breeds of flesh and fur rabbits. The youngsters grow rapidly if given a great quantity of food, but their big ears and other useless characteristics result in a large proportion of offal, amounting in some cases to nearly 50% of the liveweight. The proportion of offal in a 14-week-old Belgian Hare has been given as 40%, and it is higher in older specimens. It has been given as 37% in 4-month-old Flemish-Belgian crossbreds.

There is a certain demand for Belgian Hare does for crossing purposes, and to fulfil this function the breed will always find a place in the utility breeder's rabbitry.

SCALE OF POINTS

Colour	20	Without dewlap	10
Shape	20	Size	5
Ticking	10	Condition	5
Ears	10		
Eye	10		
Legs and feet	10		100

Lop

The Lop-eared rabbit is of British origin, and as bred in these days in England, with ears measuring perhaps 27 inches by 7 inches (the length being taken from tip to tip across the head, and the width at the widest part), is not promising material for flesh-producing purposes. The ideal is to have the width approximately one-fourth of the length. On the Continent, however, breeders are content with a modified type which has utility qualities without loss of economic features, although at the best the flesh is reputed of very moderate quality. The French Lop is considered to be one of the best of all breeds for crossing with common does to produce good table rabbits.

In Germany there is a breed of Lop of a silver-grey colour; and in France there are varieties of all colours, including one which is pure white. The most esteemed variety is a grey, descended from crosses of the English Lop and the Normandy and Flemish Giants. In Switzerland more value is placed on size (weight and length) than on any other characteristic.

The ears of the foreign breeds of Lop vary from 12 to 18 inches in length from tip to tip, and width is not cultivated. As the rabbits are not handicapped by undue weight of ear, they are nearly as active and can hold their heads nearly as high as any other variety, and as they weigh from 13 lbs. to 16 lbs., they are useful for crossing purposes to increase size.

General Appearance.—Very much like a large-headed Flemish Giant, with less length and greater breadth of body.

Head.—Very large, coarse, and markedly bent in profile, with great development of the orbitary salients, leaving a hollow in the centre of the forehead.

Eyes.—Large, round, brilliant.

Ears.—Well placed, carried against the cheeks. In length from about 15 inches to 18 inches. Width unimportant.

Feet and Legs.—Strong and short.

Neck and Body.—Dewlap very pronounced, in two or three pleats, and sometimes covering forefeet. Body short, back arched slightly, but not higher than the head, shoulders rather low.

Weight.—About 13½ lbs. to 15 or 16 lbs.

Colour.—Grey is the most favoured; blue with blue eyes is admired; also mouse-grey, fawn, black, and white self colours are allowed.

The growth of the ears of a Lop takes place most rapidly during early life. After 15 weeks it becomes very slow; and it usually ceases altogether at 5 months, although in exceptional cases it may continue until the animal is 7 or 8 months old.

The following table shows the average growth of a 23 or

24-inch Lop, the measurements being taken from tip to tip and including the width of the skull. This method of measuring adds some 3 or 4 inches to the length—that is to say, an animal which is reputed to have a length of 20 inches at 9 weeks old, will in reality probably have ears which each measure in length about 8 or 9 inches.

AGE IN WEEKS	LENGTH OF EAR Inches
2	8¾
3	12
4	14½
5	16¼
6	17½
7	18½
8	19½
9	20¼
10	21¼
11	21¾
12	22
13	22¼
14	22½
15	22¾

Experiments carried out in America led to the conclusion that temperature and humidity were much less important factors in ear growth than an abundant supply of food ; that a young rabbit well nourished up to the age of 15 or 20 weeks would, other conditions being equal, have longer ears than an animal less well fed.

FRENCH SCALE OF POINTS	
Head	20
Ears	25
Feet	10
Eye	5
Colour	5
Weight	15
General shape	10
Condition	10
	100

ENGLISH SCALE OF POINTS	
Ear length	25
Ear width	20
Substance and shape	5
Straight feet and tail	10
Colour and markings	10
Condition	10
Shape	5
Eye	10
Size	5
	100

JAPANESE

This rabbit has no connection whatever with Japan, but came as a mutation or "sport" among animals of (it is believed) the Dutch breed in France, and was first exhibited at Paris in 1887. As it represents a distinct and unique "break" in colour in the rabbit tribe, and is the most gaily painted member of the species, it is of more than ordinary interest.

The chief characteristic of the Japanese rabbit is its colour, which is some shade of yellow (often more than one shade on the same animal), more or less heavily marked with black bands or patches. An equal amount of each colour is what is most admired. In Germany (and the rabbits now in this country appear to be of this type) a large animal rather lightly marked is aimed for rather than the French type of marking to be described.

General Appearance.—That of a fairly compact, short, broad-backed rabbit, with a substantial framework and closely attached thighs.

Head.—The French type of head is much straighter, finer, and less coarse than the German type.

Eyes.—Large and brown.

Ears.—Medium length, proportionate to the body size, varying from 3½ to 5 inches in length, carried upright, and rather closely together at the base.

Feet and Legs.—Small, fine-boned, in the French type, and often the opposite in the German type. Legs short.

Neck and Body.—Dewlap should be non-existent, but is often present in does of the German type. Back short, strong, broad, and arched. Many of the rabbits of the German strain seen by the writer have had badly shaped loins.

Disposition.—Quiet, stolid, and unaggressive.

Weight.—About 5 lbs. to 6 lbs. The German type weighs from 7 lbs. to 9 lbs. or more—"as big as possible."

Markings.—The yellow and orange should be deep and rich in shade, and spread about the body in as variable a manner as possible, but the black should be confined to certain positions only, namely, on the head, and as body stripes.

(1) The head should be divided symmetrically down the centre, one side of it being a brilliant black, the other clear yellow.

(2) The back should be crossed by two or three well-placed transversal bands of black as deep and pure in colour as possible, and separated sharply from the yellow areas without an admixture of black hairs. These are the "zebra stripes." The Germans do not attach so much importance to the divided head, and profess to prefer less sharply defined and smaller "tiger stripes."

White markings, or a pure white belly colour are faults, as are also a too long body, and ears which exceed the standard length or are thick. Many rabbits of the German type, however, have white marks on head and feet.

The Japanese rabbit has a good Continental reputation for table purposes. The proportion of offal in a 4½ months old specimen has been given as 34%, and in an adult as 32%. The rabbit is hardy, prolific, and an excellent mother; the young grow quickly, fatten easily on a moderate amount of food, and are esteemed for their delicate flesh. The pelt is of little or no value for fur purposes, as, apart from its bicolouration, selection for brilliance of markings has led to the production of a very coarse class of fur. The Japanese is useful as a cross with other breeds, as it introduces no undesirable features, and its own colouration does not usually appear in the half-breds. This variety is essentially a fancy breed with table properties. The mismarked youngsters can be used for culinary purposes at about 5 months old, by which age they will give a fair carcase, and the breed is recommended to all those who like a gaily coloured rabbit with distinct markings to breed to. At the same time selection for markings, if persisted in and allowed to supersede table properties, will soon cause such a deterioration in the useful qualities that they will become as extinct as they are in most other marked breeds.

FRENCH SCALE OF POINTS

General colour	30	Type	15
Head markings	25	Condition	5
Body stripes	25		
			100

DUTCH OR BRABANÇON

The Dutch rabbit is said by the French to have been produced in England between 1825–30 by selection among the numerous Ostend rabbits of Belgian origin which were received in the London market. It owes its name to a geographical and political confusion, for, before 1830, Belgium and Holland were united.

The Dutch rabbit is of interest, then, as being the chief representative in this country of the Brabançon or ancient Belgian breed, which up to within a year or two ago formed the basis or foundation stock of the great Ostend rabbit trade.

Our Dutch rabbit is at the present day noted for the quality of its flesh ; but its small size and bicoloured pelt depreciate its value from the utility point of view. Bucks crossed with Flemish or Belgian does give a very good type of table rabbit, and this cross has been in favour among Continental breeders for a great number of years.

A short account of the Brabançon rabbit may be of interest. The name applies to a type rather than to a variety, and it is the " common " rabbit of the North of France and Brabant vale, which has been ameliorated in recent years and recognised as a distinct breed since 1884.

The chief characteristics of the breed are :

A *mandoline* shape of body to which much importance is attached, as a great development of croup and back and a light forepart mean good flesh-carrying properties and a proportionately small percentage of offal. The rabbits are usually about the size of Dutch, but in the more fertile districts of Belgium they are in some cases fairly large, running from nearly 6 lbs. to about 11 lbs.

Head.—Fine and long.

Eyes.—Dark.

Ears.—Straight, long, and upright.

Back.—Long, but very broad and arched, and thighs very fully developed.

Colour.—Grey, black, yellow, and blue, with a white blaze, collar, and feet. There are several offshoots or sub-varieties named after the districts of their origin which differ only in colour. The best-known are the Blue Beveren (self blue) ; the Saint Nicholas rabbit, which is like a Blue Beveren with a white blaze ; the Bünche breed, which is fawn with a white blaze and bib, and which has a reputation for its excellent flesh ; the Merchtem, which is uniform blue ; and the Wachtebeke, which is dark grey-brown with white marks on head, throat, and feet.

Brabançon rabbits are reputed hardy, gentle, prolific, and grow and fatten readily on a small amount of food. Crosses with the Flemish Giant give a very desirable type, many representatives of which graced our markets in recent years.

The table rabbits used to be bred by the Flemish smallholders or farmers and sold to rearers at five or six weeks old for 5*d*. to 6*d*. apiece. At 4½ months old they weighed from about 5 lbs. to nearly 6 lbs., and were worth in winter from 1/8 to 1/10½ apiece; in summer the value fell to 1/3 to 1/6 each.

Presumably the limitation of the white markings to the neck and extremities in all the marked varieties of the Brabançon rabbit do not seriously depreciate the pelt; at the same time the rabbits are essentially table rather than fur breeds, and no great value is attached to the pelts of youngsters. As is well known, the English variety (Dutch) has white shoulders, the line of demarcation being *behind* the forelegs, which makes the usable parts of the pelt bicoloured and therefore of no value.

The proportion of offal in pure-bred Dutch rabbits has been given as 30% in a 4 months specimen, 31% in an adult.

BELGIAN SCALE OF POINTS OF BRABANÇON

Blaze on head	15	Ears	5
Collar	25	Eyes	5
White tips to hind feet	15	General appearance	10
Neck of an immaculate white	15	Weight	5
General colour	5		100

ENGLISH

Spotted rabbits of the English type, known in old days as the Butterfly Smut, exist as recognised breeds under various names in France, Belgium, Holland, and Germany. All are larger than our rabbits. The Belgian Land rabbit weighs from 12 lbs. to 14 lbs., the French Butterfly from 10 lbs. to 11 lbs., the German Spotted Giant from 10 lbs. to 15 lbs., and the English rabbit from 6 lbs. to 8 lbs. In Germany a breed exists with the "English" type of marking in black on a yellow ground colour, which originated from crosses with the Japanese rabbit.

Scientific experiments in heredity have shown that the spotted pattern is dominant to self colour in a cross.

Head.—Fine.

Ears.—Rather large and upright.

Body.—Long, and should be fairly broad across the back; but rabbits of British strains are frequently long, narrow rabbits.

Legs.—Medium length, fine in bone.

Coat.—Short and sleek.

Colour.—White, with a certain pattern of markings in either black, blue, grey, or tortoiseshell.

Markings.—The nose mark is formed symmetrically in the shape of a butterfly from three spots joined together, the central spot representing the body of the insect, a spot on each side forming the wings. The pigmented ears, the eyes encircled by rings of colour, and two cheek spots make up the head points. The rabbits have a dorsal line of colour called the "saddle," which runs from the root of the ears to the tail, and should be of a herring-bone pattern; the "chains" are formed by a series of small spots which cross the shoulders from behind the ears and join a cluster of spots in the region of each thigh. Leg spots and six teat spots complete the pattern.

The French Butterfly rabbit is hardy and easy to rear, and, except in the dark colours, which are reputed hard in flesh, make excellent quality table rabbits. They are said to develop rapidly and fatten easily, and they also cross well with the Flemish Giant.

Disposition.—Lively and unaggressive.

ENGLISH SCALE OF POINTS

Head markings:		Body markings:	
Perfect butterfly smut	15	Unbroken saddle	10
Eye circles	8	Loin markings	12
Cheek spots	5	Chains	12
Ears	5	Leg markings	7
		Teat spots	6
		Colour	10
		Size and shape	5
		Condition	5
	33		67

VARIETIES BRED FOR FLESH AND NATURAL FUR

CHAMPAGNE SILVER

In the district from which it takes its name the Champagne Silver is, or used to be, largely bred for the sake of its fur, which is used in imitation of chinchilla. In 1887 the pelts used to fetch as much as 3/– apiece, but in recent years the value has fallen to a third of this. In the neighbourhood of Troyes the annual production of 60,000 skins was insufficient to supply the demand.

General Appearance.—A longish, large, comparatively long-thick-and-loose coated, and usually light-coloured rabbit.

Head.—Large and rather long, with a round skull.

Eyes.—Brown.

Ears.—Medium length, fairly thick and strong, slightly rounded at the tips, carried upright.

Neck and Body.—Neck thick and short, and preferably without dewlap, but this is allowed in the doe if small and regular; back long, broad, and arched.

Legs.—Medium length and strong; toe-nails black.

Coat.—Fine, glossy, silky, long and loose or open, rather than compressed closely to the body.

Disposition.—Timid, like all rabbits of the Silver tribe.

Colour.—" Old silver." This shade is produced by a mixture of black and white hairs, white predominating. Uniformity of colour is indispensable, and the extremities must not be darker than the body colour. Under colour, dark blue. Care has to be taken when breeding to prevent the colour becoming too light or almost white by mating light and dark shades together and avoiding consanguinity. In the department of Othe, a dark shade of the variety is bred.

Size.—The minimum weight is about 9 lbs., and up to 11 lbs. is permissible. The value of the pelts of the rabbits from the Champagne district is due to their size, the superiority of fur coming from well-reared animals, the careful manner in which they are skinned, and the intelligent manner in which the pelts are dried. The rabbits are hardy, and able to stand cold better than great heat. The best skins are produced from the progeny of fully mature breeding-stock of at least ten months old. The number of litters is restricted to three or four, and the number of young reared in a litter reduced to four or five, when the best class of pelt is desired; but as a general rule four litters per annum of five or six young, during three years, is what is expected of a doe.

As in all silver greys, the young are born black, and the silvering commences to come at about 6 weeks old, and is not completely finished until the animal is 6 months old. Although the process may be hastened by warmth, this deteriorates the quality of the skins, and the best pelts are those from rabbits reared out of doors.

In the best establishments the young silvers are reared in lots of ten from the time they are weaned at 6 or 7 weeks old until ready to kill at 6 months upwards. Each lot occupies a pen of about 54 to 72 square feet, surrounded by wirework about 3 feet high, and sunk in the ground 1 foot, the pen being furnished with a hut for the animals to lie in. The males are castrated when about 3 months old.

The skins of the rabbits fall into one of two categories. The *recette* is the skin of a fully adult specimen with no black marks on the inner or flesh side or other imperfections. The *rebut* is, generally speaking, the skin of an adult rabbit killed during a normal, accidental, or partial moult. Rabbits killed at 3 or 4 months old yield skins of small value.

From about November 15th to April 15th 70% of the pelts of rabbits from 6 to 7 months old are *en recette*, and worth rather more than 1/– each; the rebut fetch 3*d*. each.

From April 15th to June 1st the rabbits are moulting, and only about 50% fetch the best price of 8*d*. to 9*d*. apiece; the remainder 2½*d*.

From June to October the rabbits are in summer coat, and 60% of the skins will fetch about 6*d*. apiece; the remainder about 2*d*.

From October to mid-November the price varies according to individual quality.

The object of the breeder is to have as many of his rabbits for sale at that time of year when the skins are at their best without at the same time keeping the animals longer than is necessary. The French scheme suggested is as follows:

BIRTHS	SALES
February 15th	October 15th.
May 1st	October 31st.
August 15th	February 15th.
November 1st	April 30th.

The youngsters born in November and sold in April when immature of coat are considered to give as good a return as the others, because what is lost on the pelt is more than compensated for by the high price the flesh fetches in the spring. It should be added that in the present writer's experience in a mild season rabbits kept in the south of England often begin to moult in the middle of February, hence their fur apparently declines in value earlier than winter skins from the northern parts of France.

The flesh of the Silvers fetches, on an average, about 8*d.* per lb. at Troyes market. The delicacy of the flesh, for which the breed is noted, depends upon the age at which the animals are killed, the food given, and the attention paid to hygienic conditions. In winter the rabbits are fed on cooked potatoes and beet mixed with bran, carrots, lucerne and sainfoin hay, oats, and a mixture of wheat husk and pulped beet.

FRENCH SCALE OF POINTS (1912)

Colour :—		Eyes	5
General uniformity	30	Weight	20
Undercoat	20	Condition	5
Type	10		
Coat	5		—
Ears	5		100

SILVER GREY, FAWN, AND BROWN

At French shows the English Silver Grey, *riche,* or dark silver is separated and regarded as a distinct variety from the light-coloured Champagne Silver.

General Appearance.—Massive conformation, with well-filled-out flanks, light forequarters, and somewhat arched back.

Head.—Strong, a little bent.

Ears.—Short, straight, pointed at the tips, carried close at the base.

Eyes.—Dark.

Neck and Body.—Neck thick, dewlap absent, back slightly arched, croup round.

Coat.—Fine, short, elastic.

Colour.—Undercoat pale close to the skin, shading to rich blue. Upper coat blue at the base, extremities brilliant, black predominating.

Weight.—About 7 lbs. to 8 lbs., but often much less. Modern exhibition English Silver Greys rarely weigh as much as 5 lbs.

The Silver Fawn, or Cream, as it used to be called, is a French production which has been more cultivated in England than in its land of origin ; the Silver Brown is a British breed. The Fawn is essentially a fawn-coloured rabbit with silvering or white hairs ; the brown is of the compound type of colouration of the wild rabbit with silvering, and as bred in England it is very small.

As no practical use has yet been found for the fur of either of these varieties, they are very little cultivated on the Continent, and may be dismissed briefly. The chief difference between the English and French Silver Fawns is that, whereas the former has a white belly, the French rabbits retain the fawn belly of the original type. In weight the rabbits are about 5 lbs.

Silver Grey bucks cross well with Flemish or Belgian does, giving a quick-growing, compact, and good quality table rabbit of the " wild " colour. The proportion of offal in a pure Silver Grey has been given as 35%.

BLUE AND WHITE BEVEREN AND VIENNA

There is such confusion between these varieties, both in this country and apparently on the Continent as well, that some explanation is necessary.

The Blues which we have at the present time in England belong to two distinct types, although they pass under the same name. It is also necessary to add that they are quite different in type to Imperials or self-blue rabbits thrown by Flemish Giants, English, Dutch, or Blue and Tans.

In the spring of 1915 a lady in the Midlands secured a trio of Blue Beverens through a London firm to amuse and occupy a Belgian boy who was living with her. The descendants of these rabbits are small (about 5 lbs. to 6 lbs.), compact animals, essentially of a table type. They have small, pointed ears, pointed muzzles, brownish eyes, mandoline-shaped bodies, with great development of the thighs and back, light shoulders and fine bone. Their coats are short, and the colour is a medium to dark blue. They are, in fact, the old or Brabançon type of Beveren (see Dutch or Brabançon), and are an excellent type of table rabbit with fur of no particular value.

In the late summer of the same year a Belgian man, temporarily resident in this country, imported some specimens of the breeds "most esteemed in France and Belgium," among them Blue Beverens. Incidentally it may be mentioned that his collection included Normandy Giants, Champagne Silvers, and Havanas.

The Blue Beverens from this source differ totally from the others, and are, in fact, in reality Blue Vienna Giants, which of recent years passed under the name of Beveren in France and Belgium and won prizes in Beveren classes. So alike were the Beverens and Viennas exhibited, that when classes were provided for both varieties (more often the class was for "Blue Beveren or Vienna"), the judge's comment was to the effect that it was absurd to provide two classes for rabbits which were precisely similar. The Blue Beveren takes its name from a town near Antwerp, where it originated.

The Giant Beveren, as it seems better here to call it, was made by an Austrian fancier from the crosses of three varieties, including the Belgian Giant, a blue breed called the Lorraine Giant, and a French Lop, and was first exhibited at Vienna in 1895.

General Appearance.—Mandoline shape, medium size, long; high on hindfeet, hindquarters very developed.

Head.—Sufficiently fine in the female, heavier in the male. (Profile markedly bent down, muzzle coarse.)

Eyes.—Eyes large and brilliant, dark blue.

Ears.—Long and sufficiently narrow, carried in the form of a V.

Thighs.—Very developed, forming projection.

Tail.—Large and held tightly against the croup.

Feet.—Forefeet fine and short; hindfeet stronger and longer.

Coat.—Hair long and silky, very lustrous; undercoat dense, skin very fine. (The fur is about twice as long as that of an ordinary rabbit's, is exceedingly fine, and lies loosely on the body.)

Colour.—Clear intense blue.

Nails.—Blue, or white with blue marks.

Weight.—From 6¾ lbs. to about 11¼ lbs. The larger the individual is, the larger is the pelt, and the more valuable are both the flesh and fur of the animal.

Faults.—Ears open and spoonshaped, as in the Flemish Giant; the extremities whitish; hairs other than blue.

Causes for Disqualification.—Ears pendant, hair coarse, woolly; legs bent; traces of crosses.

SCALE OF POINTS

Mandoline shape	20	Back	5
Colour	20	Head	5
Weight	15	Feet	5
Ears	10		
Development of thighs	10		
Fur	10		100

With the exception of the present writer's additions in brackets, the above scale of Points and Standard were adopted by the "Rabbit Breeders' Club" of France in June 1912, and apparently endeavour to combine the good points of both types of self-blue rabbit.

The Giant type of Beveren breeds more remarkably true to type (when like is mated to like) than any other variety of animal the present writer has ever come across; in some fifty young rabbits only one which differed slightly in being a shade darker than the others has been seen. As a rule, when the variety is uncrossed with the Brabançon type, the wonderful light shade of clear, intense blue is inherited by almost all the young; as is also the blue eye with a haw, the rather round-tipped ear, the length and fineness of coat, and all the other striking characteristics. It is not exceptional to get specimens with a white spot on nose or white tip to paw, which is probably due to debility in the does rather than to any other cause. The rabbits are so prolific, that it is not uncommon to have litters of ten or a dozen. A young doe of 6 months old had 12 in her first litter and reared eleven. From their shape it is probable that the proportion of offal is high. The breed is essentially a fur rather than a table rabbit. The pelts used to average about 1/– each in Belgium, and were used in imitation of Arctic fox and Siberian squirrel. The animals are exceedingly hardy, enormous eaters of food during the growing period, and difficult to keep in good condition at all times without rather heavy and expensive feeding. The Brabançon type are small eaters and fatten easily.

In disposition the Brabançon type of Beveren is timid, but often exceedingly pugnacious and bad-tempered in many specimens. The Giant type is gentler in the bucks, and remarkably fearless and intelligent at all ages; but this fearlessness is apt to develop into aggressiveness and temper in the adult does, which are consequently sometimes difficult to mate and at times most unpleasant to handle and attend to.

White Viennas are counterparts of the Blues in every respect except colour, and have retained the steel blue eye of the parent race. They are one of the newest Continental varieties. In 1914 there were a few specimens in this country, some of which had brown spots or marks.

White Beverens, to coin a name for a variety which was apparently produced for the first time in 1916 by a breeder in Derbyshire, were thrown in the litters of some of the Blues descended from the Brabançon Beverens already described. The present writer acquired two does and a buck when 5 weeks old, and they turned out precisely like large Himalayans, but with *blue* points.

The rabbits were white at first, and the colour on the points came through gradually and got to its best at about 6 months old, as in Himalayans. They may legitimately be considered a distinct variety, and have been much admired by all who have seen them. They should prove a valuable addition to the flesh and fur breeds, as they breed true to their own colour.

HAVANA

The Havana rabbit is quite unique, for it is self brown or chocolate in colour. It originated in Holland among some common rabbits running loose in a stable in the year 1898. The sire was unknown, and the mother, a black doe, was bought by a gardener at Ingen, and a fortnight later produced a litter of seven young in which was a pair of a chocolate colour with red eyes. Their value was recognised at once, they bred true to colour, and the new variety was rapidly established and soon spread to France and other countries. They were first exhibited as Havanas in Paris in 1903. Havanas were introduced into England by a lady fancier in 1908, and there have been other importations since then, including specimens in 1915 and 1917.

The breed is of importance because, in addition to its colour, which makes the pelts valuable and in demand as imitation of Marten, the winter coat is marvellously thick and close, and superior in this respect to most other breeds, while the rabbit yields to none in good table properties, such as quality and quantity of flesh, and a low percentage of offal (33% to 35%). On the Continent the skins used to fetch as much as 3/– apiece.

General Appearance.—A very compact, sturdy, particularly well-balanced rabbit, of medium size.

Head.—Short, fine, rather broad in bucks.

Ears.—Small (3½ inches to 4 inches), sharp-pointed, carried upright and fairly close together. The largest and best utility type of Havana has comparatively large ears carried rather widely.

Eyes.—Brown; they glow redly in a dim light.

Neck and Body.—In the best table type the neck is very short, and there should be no dewlap. The body is short, back arched, very broad across the loin and rump, with thighs well developed and tightly attached to the body.

Legs and Feet.—Legs short, bone fine. Extreme fineness of bone, as seen in some specimens, is not desirable, as it is apt to accompany a weedy frame. Toe-nails brown.

Coat.—Relatively long, but it lies so closely that it looks less long and thick than it is.

Colour.—Rich uniform chocolate brown on top, with very pale pearl-grey undercolour. White hairs in the coat should not be tolerated, as they depreciate the value of the pelt.

Size.—Exhibition specimens should not exceed 5½ lbs. The original rabbits weighed about 7½ lbs., and this weight is desirable in utility strains.

Disposition.—Timid, but as a rule gentle and good-tempered, and many specimens with handling become particularly tame and friendly.

Havanas are small eaters, and fatten very easily on grass and simple food. They will give a nice 3 lb. to 3½ lb. carcase at 18 weeks old, and they are often fit to kill several weeks earlier. They mature very early, are prolific in the larger strains, and are particularly good rearers of plump youngsters. The small exhibition type of rabbit is dwindling in size, and rarely reaches within a pound and a half of the standard weight. A larger rabbit, such as they are endeavouring to produce in Holland, is desirable, if a weight of, say, 7 lbs., can be attained without loss of type.

"Lilac" or "lavender" rabbits with red eyes are the dilute form of chocolate, originally produced by crossing Havanas and self-blue rabbits. They breed true to their own colour, and have proved to be recessive in a cross with chocolate.

FRENCH SCALE OF POINTS	
Type	20
Ears	10
Eyes	5
Coat	5
Weight	20
Colour	30
Condition	10
	100

ENGLISH SCALE OF POINTS	
Colour	30
Shape and size	30
Ears	10
Feet	10
Eyes	5
Coat	10
Condition	5
	100

BLACK AND TAN AND BLUE AND TAN (TANS)

The Black and Tan rabbit came as a "sport" in 1887 among some Dutch and common rabbits turned out with wild ones in the grounds of Culland Hall, near Brailsford, in Derbyshire. They were introduced into France in 1894, and have reached a position of some popularity on the Continent. The Blue and Tan was produced later in England by crossing. Blue and Tans breed true to colour when mated; Black and Tans, when mated together, often throw about 25% of blues.

General Appearance.—A neat, compact rabbit of very small size.

Head.—Short and not coarse.

Eyes.—Dark brown.

Ears.—Very small and neat, pointed, upright, and tightly carried.

Neck and Body.—Neck rather short, no dewlap. Body compact and broad, with closely attached thighs. Back rather arched.

Legs and Feet.—Legs short, bone fine but solid.

Coat.—Short, but very bright.

Colour.—Brilliant black or clear dark blue. The markings should be as deep and rich a shade of tan as possible, clean cut, and limited to the following areas: The triangle, which is on the upper part of the neck behind the ears; the insides of the ears; borders along the edge of the lower jaws; round the eyes and nostrils; a spot at the base of each ear; the chest, belly, flanks, and underpart of the tail; the forelegs at the back and on the feet; the hindfeet on the inner halves. On the Continent a chocolate or Havana and tan breed exists.

Weight.—Exhibition specimens should not exceed 5½ lbs., and are often considerably less. For practical breeding the French consider that the weight should reach 6½ lbs. to 7 lbs.

Tans fatten easily, and yield a very delicate and excellent quality of flesh. The pelts of blacks (which must be free from an admixture of tan or white hairs among the black) were coming to the front in France of recent years, and it was considered that a good future lay before the breed as a fur rabbit when bred in sufficient numbers. There is no particular object in breeding the blues for fur, as there are as good or better self-blue breeds; but there is as yet no established French or English breed with a black coat, although there is a German breed of this sort, called the Alaska. The proportion of offal in a 4½ months specimen has been given as 35%.

FRENCH SCALE OF POINTS

Quality of the tan	15	50
Triangle	5	
Forefeet	5	
Hindfeet	10	
Chest and flanks	5	
Nostrils, around eyes, jaws	5	
Ears (interior)	5	
Quality of the black	10	20
Colour of back	5	
Ears (exterior)	5	
Shape	10	30
Ears (short)	5	
Eye	5	
Condition	10	
	100	

ENGLISH SCALE OF POINTS

Black, dense and sound	10	
Tan, deep and rich	15	
Triangle	5	40
Hindfeet	10	
Forefeet	5	
Chest, flanks, and belly	10	
Nostrils, eyes, and jowl	5	
Ears, outer and inner margins	5	
Ears, short and black	10	
Shape, Dutch	10	
Eye, full	5	
Condition	10	
	100	

New Zealand Red

This is a self-fawn variety of rabbit, introduced from California by a lady in 1917, where it is bred for its flesh and fur.

General Appearance.—Large, massively built, compact rabbits of lively disposition and good temper. The following standard was received from California :

Head.—Medium, full and shapely. Colour to match body colour, with as little white under nose as possible. 5 points.

Ears.—Erectly carried, medium thick, 5 to 5½ inches long, to match body in colour, free from black lacing. 10 points.

Eyes.—Large, bright, and hazel, with as small white circle as possible. 5 points.

Colour.—Even reddish buff, free from black hairs, carried well down into skin, under sides and hindquarters. Reddish cream belly colour. 30 points.

Shape.—Body medium, and medium broad fore and hindquarters ; does to have an even dewlap. 10 points.

Weight.—4½ lbs. at 3 months; 5 lbs. at 4 months; 6 lbs. at 5 months; 8 lbs. at 8 months; at 12 months does to weigh 10 lbs., bucks 9 lbs. 20 points.

Legs and Feet.—Strong and straight, medium heavy bones. All four feet same as body. 15 points.

Condition.—Full in coat and solid of flesh. 5 points.

Disqualifications.—Lopped or fallen ear; crooked feet; other than hazel eyes; white bars on front feet.

HIMALAYAN

This variety of rabbit is known as "Russian" rabbit all over the Continent, and is thought to have originated in the north of China.

General Appearance.—A very neat, active, small rabbit of a pleasing type.

Head.—Small, muzzle pointed.

Ears.—Small, pointed, carried upright and tightly.

Eyes.—Red.

Neck and Body.—No dewlap. Body rather long (snaky), slightly arched, and not particularly broad.

Legs and Feet.—Legs short, bone fine.

Coat.—Short, fine, soft, brilliant, and lustrous.

Colour.—White, with the nose, ears, feet, and tail black.

Weight.—In France, 5½ lbs.; but specimens of modern English strains are often considerably less.

Disposition.—Gentle.

The fur of the Himalayan is valued for its silky texture, and is used in imitation of ermine. The flesh is said to resemble chicken, and is greatly esteemed abroad. The rabbit is prolific and a good mother. The young grow quickly, but must be kept in semi-darkness if their points are to develop to the darkest shade possible. When they leave the nest the young rabbits are white, and the black extremities gradually appear as the moult proceeds. The rabbits are at their best for fur purposes at about six months old.

It is important to secure stock with really dark points. If dark-pointed individuals only are bred from, the desired results will be obtained; but there are at least three different (hereditary) types of varying density, and to perpetuate the two lightest of these, or to cross the darkest with either of the others, is not going the right way to produce a maximum number of high quality animals. It is, of course, desirable to breed as large a type of rabbit as possible; but as in France it has been found in practice that the larger rabbits lack density of colour, a moderate, or what in foreign opinion is a small size of rabbit, weighing not more than about 5½ lbs., is the type with which breeders are contented.

Beyond giving 5 points to body colour, which are deducted from the number given in England to the hindfeet, the French and English scale of points are the same.

The German Chamois Thuringian rabbit is a yellow breed with dark points, which develop like those of the Himalayan. In England it would probably be called a tortoiseshell.

ENGLISH SCALE OF POINTS

Ears	15	Shape	5
Nose	15	Coat	5
Forefeet	15	Weight	5
Hindfeet	25	Condition	5
Eyes	5		
Tail	5		100

IMPERIAL

The Imperial is a self-blue rabbit, made by an English lady fancier by crossing the Lop, Angora, and Dutch, and first exhibited in 1903.

General Appearance.—A medium-sized, long, and rather narrow-bodied rabbit, with arched back and short legs.

Head.—Medium length, not coarse.

Eyes.—Large, bright, dark blue.

Ears.—4 to 5 inches long, round at the tips, carried erect and fairly close together.

Neck and Body.—Neck, medium length; body, long, narrow, and arched.

Legs and Feet.—Short, fine in bone, toe-nails dark.

Coat.—Thick, soft, lying close to the skin.

Colour.—An even dark blue.

Weight.—Over 6 lbs. and not to exceed 7 lbs.

SCALE OF POINTS

Colour	30	Coat	5
Shape and size	30	Condition	5
Legs and feet	5		
Ears	10		
Eyes	15		100

POLISH

The origin of this breed is obscure, but in French opinion it has probably come by selection from Dutch rabbits. It is essentially a fancy rabbit by reason of its small size and delicacy, yet has possibilities as a fur-producing breed.

General Appearance.—Very small and extremely neat and compact, much like a wild rabbit in type.

Head.—Short and broad, nose rounded.

Eyes.—Pale red.

Ears.—Extremely small, pointed, and carried very smartly.

Neck and Body.—No dewlap, neck short. Back broad, short, slightly arched; croup large and rounded.

Legs and Feet.—Hindlegs rather long, bone fine.

Coat.—Very fine, short, and lustrous.

Colour.—Pure white.

Weight.—Not exceeding about 3½ lbs.

This breed yields pelts which, in spite of their small size, fetch as much as 1/8 to 1/10 apiece in France if of good quality. As the animals are so small, they eat little and can be cheaply raised. They are fairly prolific and good mothers, but reputed difficult to rear and subject to diarrhœa if not very carefully fed on a restricted amount of green food.

FRENCH SCALE OF POINTS		ENGLISH SCALE OF POINTS	
Type	20	Shape	25
Ears	10	Coat	25
Coat	10	Colour	15
Eyes	10	Ears	15
Weight	15	Eyes	15
Colour	25	Condition	5
Condition	10		
	100		100

OTHER WHITE VARIETIES

On the Continent, in addition to the blue-eyed White Vienna Giant already alluded to (see under Blue and White Beveren and Vienna), there has recently been produced a black-eyed white giant variety which promises to eclipse the Polish as a white fur-bearing breed. The larger pelts and hardier constitutions of the new varieties are greatly in their favour. Breeders also recommend breeding a large-sized white breed side by side with Champagne Silvers, as the does crossed with Silver bucks give a preponderance of young of an excellent medium shade of silver, and these crossed again with silver tend towards the latter type rapidly and consistently.

White fur is in great demand, as it dyes to any colour. Furthermore, from the breeder's point of view, uniform white pelts are the easiest of all sorts to produce. For one thing, white rabbits possess more under than upper coat, and as it is the latter which takes so long to come through and become fully set, the pelts of white animals are ready after each moult sooner than most other varieties. Furthermore, a much larger proportion of white skins, as many indeed as 95% from December to the end of March, and never less than 50% at the most unfavourable seasons, will be of the best quality and worth the highest price. At times mixed first and second grades of these skins have fetched as much as about 84/– for 104 pelts for dyeing.

VARIETY BRED CHIEFLY FOR ITS WOOL

ANGORA

The Angora rabbit, of obscure origin, is the subject of a special industry in France, being cultivated for the sake of its wool, or *soie*. The chief characteristics of the commercial type of rabbit are as follows :

Head.—Long.

Eyes.—Pale pink in the white variety, dark in the coloured.

Ears.—Short, fine and supple, and carried upright. They should be furnished at the tips with long tufts of fur.

Neck and Body.—Neck short and strong. Body long.

Legs and Feet.—Legs short, bone fine, feet rather large.

Coat.—Long and very fine. In length from 5 to 10 inches. It is formed mainly of long undercoat, and should be extremely silky and soft to the touch. Woolly or cottony coats, feeling hard, are not desirable. When undercoat is deficient, the coat separates and falls to each side, leaving a bare line down the centre of the back ; when the coat is as thick as it should be, it stands out all over and completely hides the skin. Uniformity is an important point.

Colour.—The most commonly cultivated variety is the white, which is esteemed for the length and fineness of its produce. The wool of blacks is also used commercially, and commands the highest price ; but it is comparatively coarse and less abundant. No other colours have a serious economic value.

Weight.—From about 6¾ to 11 lbs. ; the larger specimens, if free from coarseness, are preferred, as they yield most wool.

Disposition.—Gentle.

The system of management is as follows : Every Angora rabbit from the age of one month is placed on a table and *combed* once a week, to keep the coat from matting. At the age of 6 weeks the youngsters are weaned and transferred to large pens comprising ten individuals of the same sex and age. An area of about 1 square yard per head is allowed. At 3 months old the youngsters are sub-divided into lots of four or five, and henceforth kept together thus if not required for breeding.

At 2 months old the first yield of down is obtained, the amount averaging 1 oz. To secure the wool the operator sits down and places the animal on his knees, passes a comb through its coat, then, holding a pinch of skin with the left hand, gently pulls out the fur with the finger and thumb of the right hand, tuft by tuft.

The stuff is said as a rule to come out easily ; if it fails to do so, the operation is deferred for from eight to ten days. Neither the head, tail, nor the feet below the thighs are denuded ; and in the case of breeding does the operation is performed two or three days before they are mated, so that a sufficient length may have grown again by the time the litter arrives.

The second plucking takes place at the age of 4½ months, when nearly 2 ozs. of wool may be expected ; and the same amount is secured at the age of 7 months and 10 months respectively. Thereafter the rabbit is deprived of its wool at regular quarterly intervals, and good specimens are estimated to average 3 ozs. or a total of 12 ozs. in twelve months.

The wool varies in price from round about 6/– to 9/6 per lb., and has to be preserved from damp and mites during collection by keeping it in a wooden or metal box with naphthalene.

As does have by far the most abundant, soft, and best quality of produce, are easy to pluck, and are less subject to " manque " or failure to renew the coat on certain regions of the body, such as the thighs, than males, no more of the latter are kept than is necessary for breeding purposes. Superfluous males are either fattened and sold off for table purposes as soon as they can be got ready, or are castrated when approaching 5 months old. Even if kept as wool producers, however, they give far less fur of first quality than females, are always hard to pluck, and their exploitation is not considered an economic success. The produce of Angoras is made into gloves, kneecaps, and other articles of special comfort to persons afflicted with rheumatism.

Rabbits of over 4 years of age become unprofitable, and the system advocated is to breed enough litters from the best does to renew one-fourth of the stock every year. A doe is expected to produce four litters in twelve months, is remated when the litter is four weeks old, and the young left with her another fortnight.

As the constant renewal of the coat exhausts the rabbits, they require high feeding, the cost of feeding ten animals in summer being estimated (in France) at 1*d.*, in winter 1½*d.* per day on crops grown specially for them, including forage plants of high feeding value, such as clover, lucerne, vetches, etc., in summer, together with oats and cattle cake ; and lucerne or vetch hay, roots, meadow hay, oats and cake in winter.

It is obvious that this industry is only suitable to the localities with the mildest climates, as even in a favourable district it is necessary to take precautions to prevent the rabbits getting chilled within the first few days of denudation. Furthermore, a high temperature is said to favour the development and augment the quality of the produce.

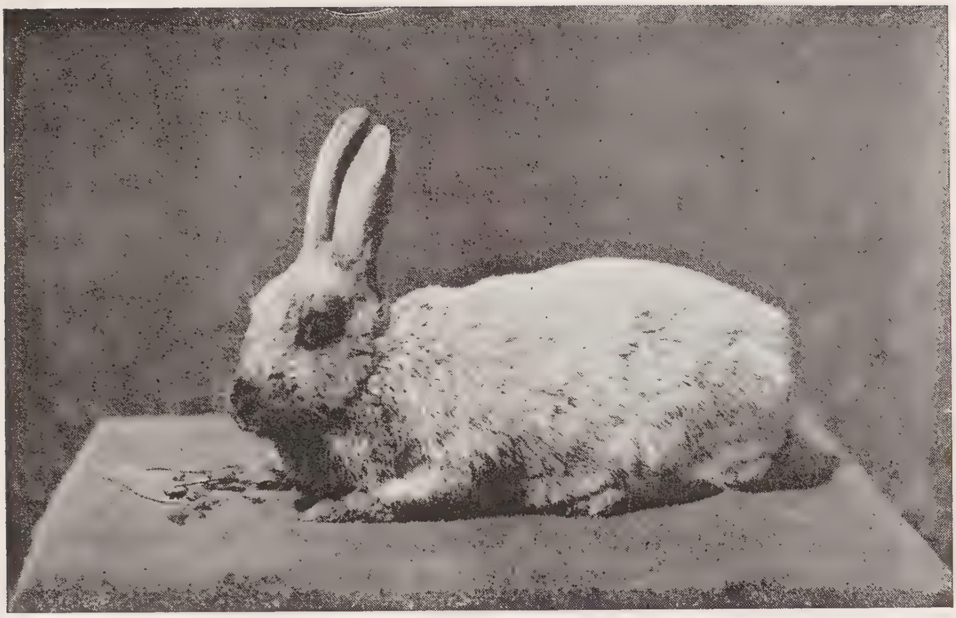
FRENCH SCALE OF POINTS	
Fur:	
Silky quality, soft and fine	25
Abundance	15
Length	15
Uniformity	15
Colour	5
Weight	5
Type	5
Condition	15
	100

ENGLISH SCALE OF POINTS	
Wool, quality	30
Wool, quantity	25
Front	10
Ears	10
Size and shape	15
Condition	10
	100

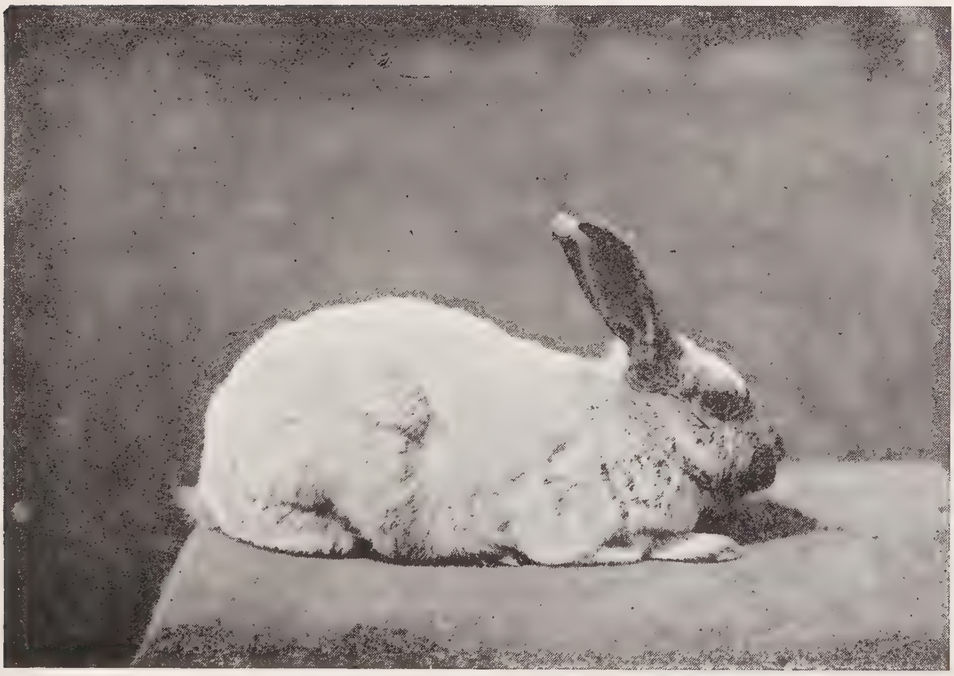
Angoras are usually bred to their own colours, viz. black with black, white with white. When black is crossed with white, the result, according to the French, is to get many white young with dark marks, or black young with white marks on nose, feet, forehead, and throat, in addition to completely black or white individuals. The black and the grey cross well; but grey and white crosses give bad results.

The rabbit called Siberian is an Angora with the dark points of the Himalayan. To produce it, reciprocal crosses are made. The cross with the Angora as the female is said to give half-breds with well-marked extremities, but coats lacking in length and silkiness. The cross in which the Himalayan figures as the female gives young with good coats, but with ill-defined markings. The best young from each mating are chosen for the second generation, a male from cross 1 and a female from cross 2, and a male from cross 2 and a female from cross 1 being mated together. With skilful selection good Siberians can be obtained as the result. A cross back with the Angora is subsequently resorted to if the coat is defective; the Himalayan is used again if the points are not dark enough. This variety is not considered to have any particular utility value.

In long-coated specimens of Angoras or Siberians it is advisable to trim off the fur on the lower and under parts of the hind legs and tail in both sexes before mating.



CHAMPAGNE SILVER DOE.



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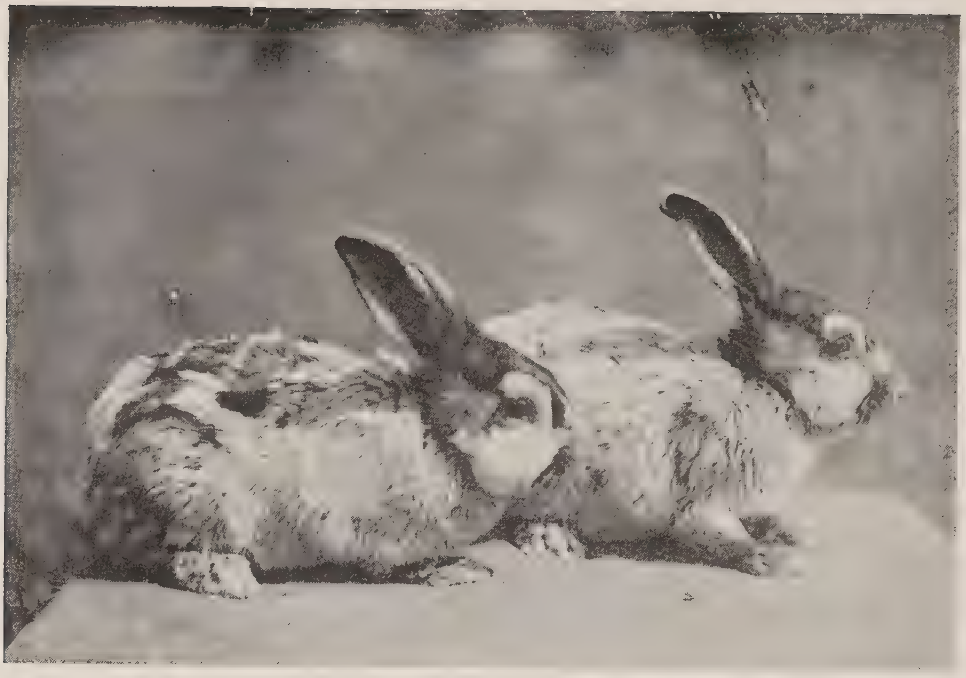
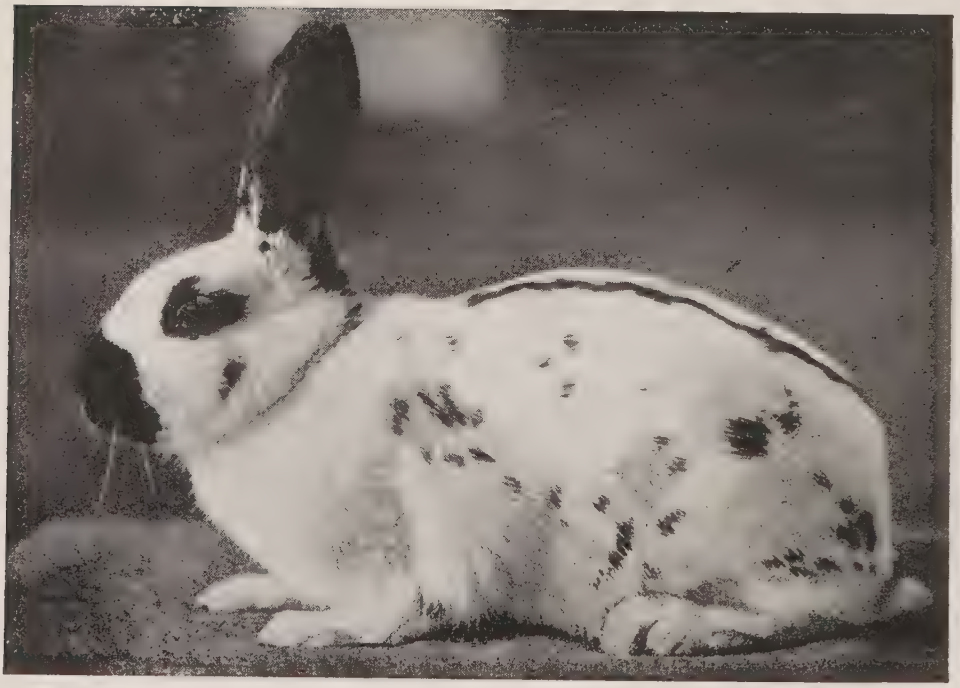


YOUNG CHAMPAGNE SILVERS.

(Half silvered.)



PEDIGREE ENGLISH BREEDING DOE.

CHAPTER II

CROSS-BRED RABBITS

THE different varieties of rabbits have been bred for many years exclusively for fancy points in England, with the result that utility qualities have been lost, and the modern breeders of table rabbits have been compelled to resort to cross-breeding in their endeavours to produce animals of a size and type which make them of economic value. In France and Belgium, on the other hand, fancy points have always taken a secondary place; all the most popular breeds are of a size and type which make every individual of utility value, and if by chance a rabbit is in addition an exhibition specimen in colour or markings, it is so much the better for the breeder. But the first consideration with Continental breeders is, and rightly, to produce rabbits of a type which furnish a maximum of the best quality flesh at a minimum cost, and possibly fur as well. The practical result is that specimens of almost every Continental pure breed are better table rabbits than the best pure or cross-breds we now have in England. Our own fanciers have hitherto scorned the valuable foreign pure breeds of rabbits because they appeared large, coarse, and clumsy to their uneducated eyes. They totally overlook the fact that no race of an adult weight of less than 7 lbs. can produce youngsters which reach a desirable weight for table purposes at 4½ months old, or can have pelts at 6 months old of a size which fetch maximum prices for fur purposes. It is not essential to cross to produce table rabbits when there are several pure foreign breeds which have most of the characteristics required; and it is hardly necessary to lay emphasis on the much greater pecuniary advantages which accrue from the production of pure rather than cross-bred animals.

BELGIAN-FLEMISH

In England fanciers for some obscure reason pin their faith to crosses between the Flemish Giant and the Belgian Hare for table purposes. The cross-breds are no doubt superior to either parent, and that is about the best that can be said for them.

It is a significant fact that this cross is unmentioned in any of the foreign books or periodicals consulted by the writer; and the omission cannot be ascribed to ignorance in view of the fondness of our Continental neighbours for trying various crosses. The fact is that in foreign opinion neither the Flemish Giant nor the rabbit we call the Belgian Hare (which is believed to have originated from the same source) is a first-class table rabbit, the former being described as stringy in flesh and far from delicate in taste, and the Belgian Hare, although better in flavour, is stated to have flesh which is hard and dry. It is therefore difficult to see where the reputed good qualities of the cross-breds can come from. As to the high proportion of offal yielded by these breeds and their half-bred progeny, this is a point which in practice mainly affects the breeder for the home table, and as long as rabbits are sold by the pound in the skins to a middleman, and he raises no objection, attention is not likely to be paid to ameliorating this characteristic.

FLEMISH AND OTHER BREEDS

For many years the cross between a Brabançon or Dutch buck and Flemish Giant does has been known on the Continent for its excellence. The young are usually grey, with more or less white. The does crossed in their turn with a Dutch or Brabançon give young with all the best Brabançon characteristics, judging them by their shape, the proportion of flesh to liveweight, and white markings limited to positions which do not deteriorate the value of the skin—that is to say, a white collar, blaze, and four white-tipped feet.

Practically all the large Continental rabbits owe their size to the Flemish Giant; indeed, the chief value of this race is its capacity for increasing the size of the smaller breeds, and it is difficult to name a modern Continental variety which does not owe something to its influence. Selection has usually followed the lines of securing descendants which fatten more easily and mature earlier than the gigantic specimens.

It is not considered that crosses of Flemish Giant bucks with breeds under about 5 lbs. adult weight, such as Dutch and Polish does, give at all happy results, as the mortality in the does is high, abortion frequent, and the young, if born alive, are often badly proportioned. Big does crossed with small bucks give the best results.

LOP CROSSES

The Lop-eared rabbit is considered a useful cross for grading up size on the Continent, and is very generally believed to have been used in the manufacture of the Vienna Blue. When a Lop is crossed with a variety with upright ears, the ears of the half-breds are usually intermediate in length, and there is at present believed to be no subsequent segregation of ear length in future generations.

ENGLISH CROSSES

When English rabbits or animals of a similar spotted type are crossed with other breeds, the result is usually to get young which are spotted. On the other hand, young with the fully marked Dutch pattern are seldom obtained in half-breds between Dutch and any other breed, although they frequently have a little white. Crosses between Dutch and English result in the eventual loss of the Dutch type of marking.

SILVER CROSSES

Silver Grey bucks crossed with Flemish Giant and Belgian Hare does give very good quality table rabbits which grow and fatten at the same time. This cross has been found, by many breeders of experience who are in a position to make comparisons, to give better results than any other.

JAPANESE CROSSES

When Japanese are crossed with other varieties, the Japanese type of colouration usually disappears. In the case of a cross with a tortoiseshell Dutch, however, some of the young were black and yellow with white marks ; in a cross with blue and tan, some youngsters of the Japanese colour came.

Cross-breds and Mongrels

The novice breeder often fails to appreciate the difference between first crosses and mongrels. Some of the best butcher's animals in all classes of livestock are the half-bred or first cross progeny of two pure breeds. The young bred from, say, a Silver Grey buck and a Flemish Giant or Belgian Hare doe are cross-breds, half-breds, or first crosses. The young of two established pure breeds, such as those mentioned, usually come more or less true to a definite type. If these Silver Flemish half-breds are crossed with still another breed of a totally different type, however, with, say, a Dutch, English, or Havana, the progeny are simply mongrels. The chief objection to mongrels is that there is (unlike the case of first crosses) no uniformity in their type and they cannot be relied upon to breed true. The progeny may come of any size, from that of a wild rabbit to a giant, and they may be of any shape and colour, therefore they are best avoided by every one who desires to perpetuate rabbits of a definite type.

Of course many of the best established breeds have been formed by cross-breeding in the first instance; but they have not reached the dignity of being considered pure breeds until, by the selection and inbreeding of similar types during a series of generations, the original tendency to variation caused by crossing has been eliminated.

Colour Crosses

If a Belgian Hare or other breed of a similar colouration is crossed with a white rabbit, the young will usually be grey in colour. In the case of the white Angora they will also be short-haired.

When self chocolate, black, blue, or fawn-coloured rabbits are paired together, the young will be the same colour as the parents; but if any of these selfs are paired with a Flemish Giant or Belgian Hare, the young will most likely be grey. Grey rabbits (Flemish, Belgian, etc.) are often liable to throw selfs, but the reverse is never the case. Marked breeds, such as pure-bred Dutch and English, throw occasional selfs, although no cross may have been introduced into the strain for many generations, and these selfs will breed a preponderance of self young if mated with an animal of a pure breed of a similar colour to their own.

Self chocolate usually disappears in a cross with any other colour except "lilac." These are some of the definite and established laws of colour inheritance which it is of advantage for the breeder to know.

It is frequently stated in the fancy press that the sire has more influence upon colour than the dam. This is an absolute fallacy. There are very few exceptions to the rule that reciprocal crosses give similar results, and there is no doubt that as good a strain for colour can be worked up through the dam as through the sire. Nor is the dam specially responsible for shape or any other hereditary characteristic as is so often believed by those who have made but a superficial study of the subject without actual experiment. The temperament of the young is often influenced by the temperament of the dam; but this is a characteristic acquired from the dam by imitation during the most susceptible period in early life when the young are with her.

Mating Half-breds

When it is desired to breed from half-breds, they should, to avoid mongrelisation, be mated with pure specimens of one or other of the parent breeds. For instance, supposing the breeder possesses a grey or wild-coloured doe, the progeny of a Flemish Giant and Silver Grey; if he mates her with a pure-bred Silver Grey, probably about half the young will in colour be indistinguishable from pure Silver Greys. If, on the other hand, he mates her with a Flemish Giant, all the young will be of various shades of grey like the Flemish Giant. The same rule applies to the descendants of the Flemish Giant or Belgian Hare and a self-coloured variety.

Wild Crosses

The wild rabbit crosses freely with all fancy breeds, the young being usually like their wild parent in colour. The French say that the cross, using Flemish Giants or large tame rabbits as one parent, gives a race which is hardy, vigorous, and with excellent flesh. No improvement in size can be expected if the wild rabbit is crossed with one of the small domesticated breeds.

One objection to introducing wild blood is that many of the descendants are apt to be exceedingly timid in disposition, which means in practice that desertions of litters and other troubles occur with undue frequency. The cross is useful if stamina is being lost in strain ; but probably equally or more satisfactory results will be obtained by crossing with carefully selected specimens of some other domesticated breed.

Selecting Cross-breds

It must not be thought that the mere fact of crossing specimens of two breeds produces good table rabbits. The fact of crossing creates no miracle. It is as important for the cross-breeder to select specimens with good backs and other table properties as it is for the breeder of pure-breds. Some breeds cross well, others do not ; but whatever cross is made, selection is the keynote to success, and without it the rabbits will soon degenerate into animals as lacking in utility properties as many of the contemporary exhibition strains.

CHAPTER III

FUR PRODUCTION

A GREAT deal of misconception seems to exist among English fanciers with regard to fur production. Breeding rabbits for their fur is a special industry, with the flesh as a bye-product. The skins of rabbits killed at 4½ to 5 months old or less for table purposes are not, and can under no circumstances be classified as " fur," no matter how choice their colour or how large their size. Such skins can only be expected to fetch the small sum given by collectors to poulterers and private persons for common rabbit skins. They are used by the fur cutters chiefly for felting or hat purposes. The skins are cut open, washed, the longer hairs pulled out, and the fur is then cut off by machinery, sorted, and blown by air. The fur of the back, ribs, cheeks and tail is the best and is separated, and is reputed to fetch from 5/- to 7/6 per lb. It is roughly estimated that on an average 100 skins furnish about 9 lbs. of wool. Coney wool, as the product is called, felts and adheres together with great readiness, and to bring this about it is placed in small handfuls in a tray, whence it is passed through a blower, which drives it on to a revolving copper disc. When it has accumulated to a sufficient thickness it is removed, washed, and is then ready for the manufacture of felt hats. The pelt is used for the manufacture of gelatine, etc.

FUR SKINS

Skins which are to be utilised as fur, whether in the natural state or dyed, clipped, or otherwise treated, must fulfil certain conditions. They must, first of all, be winter skins obtained from animals killed between the middle of November and the middle of April. Furthermore, the rabbits from which they are obtained must be certainly not less than 6 to 7 months old, and in the case of the Giant varieties, eight to nine months old at the time they are killed, otherwise the coat will not have " set."

QUALITY

It is not difficult to recognise the best quality skins obtained from animals of the right age between the dates named, for when removed from the rabbit they will be quite white on the inner or flesh side. If they have black marks or areas, indicating an accidental, partial, or normal moult, they are of small value for fur purposes, because the hair will come out on these places when the skin is submitted to the process of dressing.

The fur merchant is more interested in the size and quality than in the colour of a skin. If it is large and in perfect order, he can dye and manipulate it in any way to suit his requirements, whereas the most beautiful natural fur is of no value for his purpose if taken from an immature animal or from one which is not at the time in perfect condition as regards its coat.

FUR BREEDS

Champagne Silvers, Havanas, Blue Beverens or Viennas, Himalayans, and short-coated self black, yellow, and white rabbits are the only breeds which furnish " natural " fur of any value, and the precise value of each at a given time seems to vary with the fashions of the moment. The best samples of a sort which is in demand realise 1/– or more apiece. Angora skins are not used abroad either for cutting or fur purposes; the only economic function of this breed is to furnish *soie*. Short-coated white and black skins are always in demand.

SIZE

As regards their size, generally speaking, and with certain exceptions (Polish, Himalayans), skins must come from animals of 7 lbs. weight and upwards to be of any value. A pair of lady's shoes can be made from a skin which, when trimmed, is not less than 26 inches long by 17 inches wide, and this means that the rabbit probably weighs at least 14 lbs. or 15 lbs. alive. A 7-lb. rabbit, on the other hand, is not very likely to give a skin with a useful part of more than about 15 inches in length, from which it may be possible to cut out one man's shoe. The great length aimed for in several of the large Continental breeds of rabbits is a response to the economic value and great demand for large pelts. The length of the living rabbit is taken by laying the animal down flat and as fully extended as possible with the hindlegs in the natural position. The head is pressed down and the measurement taken from the tip of the nose to the root of the tail, following the curves.

COLOUR

Skins which are in the main whole coloured are the only ones of value for fur purposes. The usable parts of the skin are from the shoulders to the tail. White marks outside this area are of no great consequence, hence we find that many of the Belgian utility breeds have white collars, blazes, feet, and bibs which do not detract in any way from their commercial value. Breeds with white markings behind the shoulders, as in our Dutch rabbits, animals of the spotted type, like the English, or of the striped black and yellow colouration of the Japanese, are of no interest to fur producers. Again, a distinction has to be drawn between the breeds already mentioned, which furnish "natural" fur—*e.g.* skins which can be used undyed and unmanipulated in any way, in cheap imitation of the expensive furs of one or other of the fur-bearing wild animals, and breeds with coats which if used in their natural state would be obviously rabbit. The Flemish Giant and Belgian Hare come within this category, and the best skins which come up to the fur standard in quality would probably be either dyed to some colour and sold as "natural"; sheared and dyed dark brown and sold as seal, electric seal, Red River seal, or Hudson seal; dyed light brown and sold as French sable; and so forth.

DURABILITY

At its best a rabbit skin is not durable; the fur soon comes off and the wearing properties of the leather are not good. In domestic varieties the strength is reputed to vary with the colour; greys are the strongest, fawns rank next, then chocolates, blacks and whites in the order named.

COMMON RABBIT SKINS

Ordinary rabbit skins, by which is meant those taken from cross-bred, immature, or bicoloured animals, coming perhaps from the rabbitry of the breeder who specialises in the production of table rabbits, are usually sold in France to dealers who sort them out into four classes in lots comprising 104 pelts.

The first class (" fort ") comprises large skins well furred all over, and with no traces of moult. These may fetch 50/– to 60/– in the winter; 45/– to 50/– in the spring; 33/– in the summer; and 42/– in the autumn, per 104 skins.

The second class (" clapier ") comprises large skins with some black marks, skins which are small but otherwise of good quality; skins of animals killed soon after rearing a litter, etc. These fetch in winter 25/– to 30/–; spring, 20/– to 25/–; summer, 16/6; autumn, 20/– per 104 skins.

The third class ("entre deux" or "demi") includes the skins of young rabbits without black marks, the skins of adults in full moult and entirely black, and others too moulty to be included in the second category. These fetch 12/6 to 15/– in winter; 10/6 to 12/6 in spring; 8/4 in summer; 10/6 in autumn, per 104 skins.

The final class (" rebut ") comprises the skins of rabbits of two to three months old, also those belonging to the previous classes but which have been damaged by moth, mice, or cats. These at no season command more than about 1/8 to 2/6 per 104 skins.

Although prices and methods may differ slightly in England, where the skins are sorted into wholes (white), halves (small black patch), quarters (three-quarters black), and racks (quite black), the foregoing quotations give some indication of relative values, and will help to bring home to the novice breeder the importance of securing and preserving skins in good condition. As already hinted, the pelts of rabbits of the best natural fur breeds will fall into one or other of the above-mentioned categories, and be worth no more than common skins if the animals are killed when immature, or at the wrong time of year, or if the pelts are carelessly preserved and offered in poor or damaged condition.

KILLING FOR FUR

Rabbits which are to furnish fur are killed in a special way. They are held up by the hindlegs, stunned by a blow behind the ears given with a stick or the edge of the hand, and bled by the removal of an eye while suspended by the hindfeet, one of which is passed through a slit made in the hock of the other to form a loop.

The skin is removed at once before disembowelling the animal. To allow it to " hang," or to disembowel it before skinning, depreciates the value of the fur. An incision is made in the skin from the right hock to the left hock, passing close to the anus, great care being taken not to pierce the inner membrane enclosing the intestines, the tail bone is drawn out, the skin detached at the hocks, and it is drawn off delicately to the head, where a knife is required to detach it at the ears and eyes.

DRYING THE SKIN

The pelt is now suspended, flesh side out, fur within, to a nail in an airy or warm position well shaded from the sun, and out of the reach of cats. The bag it forms is filled out with straw or hay to keep it to some extent to the shape and form it had on the rabbit. This part of the process requires experience. If the pelt is filled out so as to unduly stretch it, the fur will be depreciated in quality ; if, on the other hand, it is not filled out sufficiently, wrinkles will form, and at each pleat or wrinkle heating will take place, and the fur will lose its value. In place of straw forked sticks are sometimes used, but these are much less easy to manipulate to a nicety.

When the skins are quite dry, they are usually, in the winter, suspended to a beam by the nose end in lots of up to fifty-two in a dry airy place until it is convenient to sell them. It is always risky to keep them in piles during the autumn and winter months for fear of heating or fermentation taking place in damp weather. If, however, the pelts have to be kept from, say, the end of March until the following autumn, they can be piled when quite dry, the trouble now likely to follow being attacks by moths and mites. To prevent this they are best laid in a well-made wooden box, metal lined, a lining of clean, dry newspapers being placed inside, and a sprinkling of naphthalene powder or naphthalene balls being placed between each skin. With plenty of newspaper on top to prevent the too-rapid evaporation of the naphthalene the skins should keep in good order for months. It is most important, however, not to pile them until they are quite dry.

Beginning with cats in the drying stage, followed by mice, moths, and mites as opportunity and season permit, rabbit skins are objects for the ravages of a succession of destructive enemies against which constant vigilance is necessary or serious losses will ensue.

MARKETING

As there is at present no organised fur industry in this country, the owner of a limited number of fur rabbits may find difficulty in disposing of his pelts. He is advised to dry his produce, sort it out to the best of his ability, and store carefully until he is in a position to offer a parcel of not less than one dozen first-class and well-matched skins. Armed with these, and with the residue which fall into lower categories as regards quality, he is in a position to offer something worthy of a furrier's consideration and likely to bring forth the offer of a remunerative price. It is no good offering one or two skins only, or a mixed lot comprising every quality and shade of colour. The greater the number of best pelts, the better is likely to be the price, and for this reason co-operation between small breeders specialising in the same breed in the same neighbourhood is likely to be productive of the best results.

CARCASES

The flesh of fur rabbits killed when between 6 and 12 months old is much esteemed on the Continent as being more wholesome and nourishing than the flesh of younger animals. The carcases, dressed in what we call the Ostend style, usually sell readily by weight at a price of from 6*d.* to 8*d.* per lb. according to demand and season.

REARING FUR RABBITS

Fur rabbits are usually run in roomy pens in lots not exceeding ten individuals of the same sex. If the males are castrated at 3 months old they live together amicably until ready to kill. Pens made under a roof and in a rather subdued light give fur of the best colour, and thickness of coat is obtained by not coddling or protecting the animals to an unnecessary extent.

Fur rabbits must be well fed throughout their lives. Although they have to be kept so long, it must not be thought that deficiencies in the dietary in early life can be made good by heavy feeding for a few weeks prior to killing. Good coats are only grown by well-nourished animals, digestive troubles are reflected more quickly in the coat than anywhere else, and the majority of the skins will be found to fall within the lower categories as regards quality if great attention is not paid to keeping the rabbits in a rapidly growing and perfectly healthy and vigorous state throughout their lives.

DRESSING SKINS

Although the curing of skins is most efficaciously and expeditiously performed by experts with machinery dealing with as many as 200 pelts at a time, it is possible for the breeder to prepare them by hand in a manner which will commend itself to the furrier. Correctly prepared, first-class skins will often fetch nearly double the raw article, and the cost of the work is estimated by the French at from 3/- to 3/6 per dozen. The average amateur is, however, recommended to be content with simply drying the skins in the manner already described, for this, if well done, will bring him a sufficiently remunerative price without the added risks entailed by further manipulation.

There are two methods employed in the preparation of rabbit skins: The French system of oil dressing, and the German system of water dressing.

The French or oil method is the one most suited to the amateur rabbit breeder, as it can be worked on a small scale without tools, and is applicable to the skins of all sorts of small animals.

The methods of flaying and drying the skins have already been described. When the skin is *perfectly dry*, it is thoroughly oiled with colza, olive, poppy seed, or an analogous oil.

A rope of about the thickness of the thumb and 20 inches in length is very firmly fixed by its two extremities, placed about 12 inches apart, to a beam or the top of the frame of a doorway. It thus forms a loop or half circle. Into this loop the skin, well saturated with oil, is introduced. Holding the skin at each end, it is pulled rapidly backwards and forwards. This quickly heats the part rubbing the cord, causes the oil to penetrate, and breaks the fibres which stiffen the skin. The skin, well saturated with oil, is turned to a fresh place, and the operation continued until all parts of the pelt have been submitted to the process. The most difficult parts to do are the ends held in the hands; but by perseverance the turn of the hand necessary to complete the operation is soon acquired. The object in view, which is to break the fibres and cause the oil to penetrate at the same time, is accomplished without difficulty and in a short time by a skilled operator.

The skin is now lightly wetted with a brush dipped in clean water, enveloped in a cloth to prevent evaporation, and left thus for twelve hours.

At the termination of this period the skin is unwrapped and split open from belly to muzzle.

It is now *fleshed.* This consists of raising with a knife and detaching the fine peel which covers the skin, by pulling it off with thumb and finger bit by bit. This leaves the surface nearly white, and the skin then only needs scouring to finish it off.

To scour it the skin is laid fur side up, and is sprinkled with plaster of Paris, then beaten with the hand to cause the plaster to penetrate well into the hair. It is now turned over, and sprinkled on the flesh side. When it is thought that sufficient plaster of Paris has been applied to absorb all the grease and impurities, the skin is beaten with a fine and very supple stick. Finally both fur and flesh side are rubbed with clean, dry oak sawdust, which will give a perfect brilliance to the fur, the skin is beaten once more, stretched a little in the longest direction, and the operation is completed. A beautiful skin which will preserve its suppleness should be the result.

CHAPTER IV

FLESH PRODUCTION

THE best table rabbit, be it pure or cross-bred, is the animal which (1) grows and fattens at the same time (2) on a moderate amount of food, (3) carries a large amount of flesh in proportion to offal, (4) matures early, (5) is hardy, (6) prolific, (7) and breeds true to its characteristics.

The only place whereon a rabbit carries, or can carry, an appreciable amount of flesh is the back and thighs. It is obvious, therefore, that breeders must pay the greatest attention to developing these parts. Practically everything in front of the shoulders is offal ; therefore the head, ears, and forepart must be kept as light and narrow as possible. A good table rabbit should be something like a turkey's egg in shape when looked down upon from above—*e.g.* it should narrow to a point at one end, and widen out gradually to as great a breadth as possible at the other.

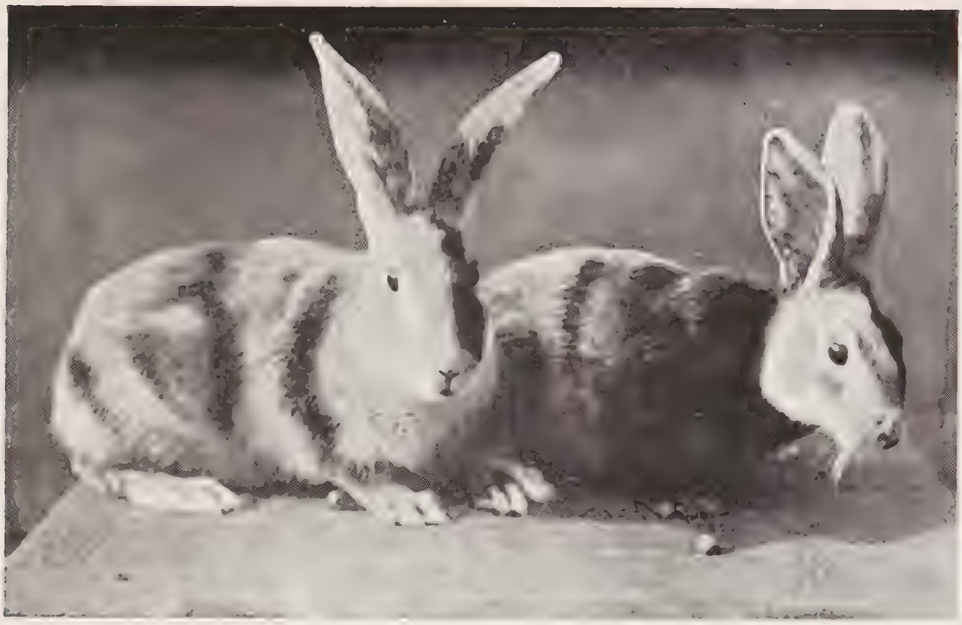
Judging by the breeds at present existing in the world, it does not seem possible to combine gigantic size (20 lbs. and over) with " table " type, and a good " natural " self fur. Many varieties have two of these qualifications but lack the third. It is questionable whether a breed with all three characteristics would be desirable from the economic point of view, because our experienced Continental neighbours seem to be firmly of the opinion that a medium-sized variety, which eats comparatively little and assimilates a large proportion of the food consumed, pays better to rear for utility purposes than the very large or " giant " types, which mature slowly and assimilate a comparatively small proportion of the food consumed ; and this is also the present writer's experience.

The Belgians pin their faith to a " mandoline " shape of body as being the best type of commercial flesh-producing rabbit, the animals being very broad across the loin and thighs, very arched in back, and very narrow and light in front of the shoulders. To get enormous weights in rabbits it is necessary to have great length ; but very large carcases are not required on the English market, and breadth not length is what it is necessary for the breeder to aim for.

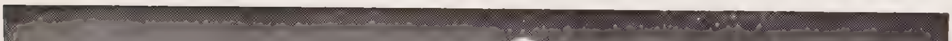
The best young specimens of the highly developed table types, like the Brabançon, have hindlegs set so far apart that the creatures rather suggest little frogs when they first leave the nest and begin to run about. If the hindlegs are set close together, the rabbit will probably show a big proportion of offal, because although, broadly speaking, the difference in the weight of the offal is not likely to be great in different specimens, the amount of flesh carried is a very variable feature, and it is the rabbits with hindlegs far apart, or in other words with well-developed backs and thighs, which carry the largest proportion. A good "back" includes, besides a good development of the lumbar vertebræ, long, well-arched back-ribs and big, well-developed, tightly attached thighs, giving a bigness and squareness of the hindquarters difficult to describe but very obvious to the eye. Every rabbit should be bred to a reasonable size and this type. When such is the case, there need be no marked difference or antagonism between table rabbits and exhibition rabbits, except that the latter will excel in certain details of colour or markings.

The size of rabbit which fetches the highest price per pound on the London market is the one which gives a dressed carcase not exceeding 3 lbs. weight, which means a liveweight of probably about 4½ lbs. to 5 lbs.

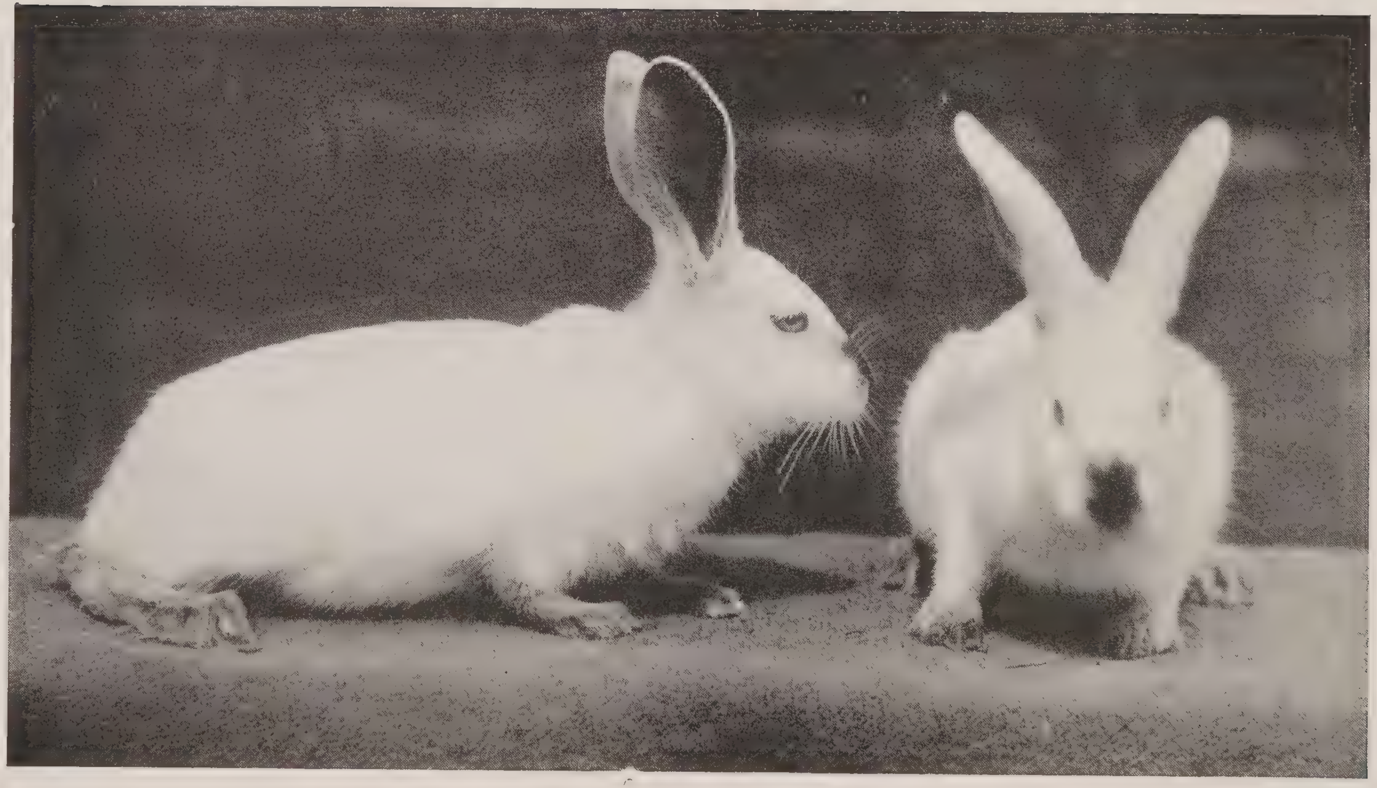
Now, it is quite easy with good feeding to get a young Flemish Giant to reach this weight at 8 weeks old, and specimens of this breed and Flemish-Belgian half-breds are frequently killed, weighing 5 lbs. or 6 lbs. at 12 or 13 weeks old. Mere weight, however, is misleading and a very minor consideration. At 3 months old rabbits are immature, insipid, flabby, and unwholesome, as well as half offal. Their produce is analogous to the gelatinous flesh yielded by very young calves or lambs killed when immature for reasons it is better not to enter into. A Flemish Giant matures so slowly that it has to be kept until it is 6 months old, and possibly over 10 lbs. weight, before it becomes firm in flesh, by which time it is far too big for the best markets.



TWO YOUNG JAPANESE DOES.



JAPANESE DOE.



WHITE BEVERENS.

The food which it has consumed meanwhile would have supported several specimens of the medium-sized breeds, which would have yielded the size and quality of carcase required at 4½ months old.

The Ostend rabbit trade was built up mainly on the supply of mature carcases of medium-sized breeds, and the business will not long remain in English hands if breeders persist in supplying the inferior quality of flesh yielded by coarse rabbits killed before they have had time to mature or become "firm." A rabbit, like a sheep or bullock, must "handle" right before it is considered fit to kill.

The proportion of offal varies as greatly as from 30% to 50%, according to the breed and age of the animal. Breeds with coarse ears, heads, and feet, combined with long and narrow bodies, will kill very badly from the consumer's point of view, and it can be taken for granted that the highest proportion of edible material is obtained from rabbits with short, broad bodies, pointed noses, and thin ears. Breeders who supply carcases dressed in Ostend style will be the ones mainly interested in reducing the offal to the lowest weight possible.

The following are the weights of the various parts of a young Havana buck of the small type, killed unfattened and unstarved at 19 weeks old:

	lbs.	ozs.
Liveweight	4	5
Weight paunched	3	5
Weight of fresh skin (without feet) .	0	8
Loss on feet, etc.	0	5
Carcase ready to cook . . .	2	8

thus giving a carcase weight of 64% of the liveweight.

A 7-months buck of the same breed, killed when fat after 12 hours' fasting, weighed:

	lbs.	ozs.
Liveweight	4	14
Carcase ready for the table . . .	3	4

thus giving a carcase weight of 67% of the liveweight.

Certain French investigators have published the following weights (here approximately translated) relating to the parts of unfattened common rabbits :

(1) Age of rabbit, 6½ months :

	lbs.	ozs.
Flesh (minus bones)	3	7
Bones only	0	10
Heart, lungs, liver, kidneys	0	6½
Skin	0	14
Intestines	0	18
Waste and evaporation	0	1½
	6	9

Carcase weight about 66½% of liveweight.

(2)	lbs.	ozs.
Flesh, bones, and fat	5	0
Heart, lungs, liver, kidneys	0	7
Skin	0	14
Intestines	1	3
Waste and evaporation	0	2
	7	10

Carcase weight about 70% of liveweight.

Expressing it in another way, the various parts of a table rabbit of 6½ to 7½ lbs. liveweight have been estimated to weigh approximately as follows :

	%		%	
Flesh, bones, and fat	60½	to	64	of the liveweight
Flesh, minus bones	51	to	54	,,
Bones only	9½	to	10	,,
Heart, lungs, liver, kidneys	6	to	6½	,,
Skin	12	to	14½	,,
Intestines	16	to	17½	,,
Waste and evaporation	1½	to	2	,,

That the loss is much greater on immature rabbits than on those killed at the proper time is evidenced by figures which have been published stating that a pure Flemish Giant, 10 weeks old, weighing 5 lbs., gave a dressed carcase of 2 lbs. 13 oz., while one weighing 4 lbs. at 8 weeks old gave a dressed carcase of 2 lbs. 3 oz., which represents approximately and respectively 55% and 51% of the liveweight instead of the 66½% to 70% given as a fair standard for a mature rabbit.

In the case of mature rabbits, fasted, killed, bled, paunched, and sold in the skins, their weight will probably be approximately 80% of the liveweight.

It is obvious from the foregoing figures that every rabbit killed when immature, and giving very little more than 40% of edible matter, is economically wasted from whatever point of view the subject is regarded. More than half the material produced by the feeder is waste matter, whereas, had the animal been kept until it was mature, an increase of at least 20% in the edible matter might have been produced. As it takes a more or less definite amount of food to produce 1 lb. increase in the liveweight of a rabbit, the only sound and economical policy is to kill these animals at the moment when it is possible to get the most favourable relationship between carcase weight and offal. That age is about 16 to 18 weeks in the medium-sized breeds (under 7 lbs. adult weight); 24 to 26 weeks in the large breeds, after a fattening period lasting three weeks.

TABLE TO SHOW THE APPROXIMATE PROPORTIONS OF OFFAL TO CARCASE WEIGHT OF DIFFERENT BREEDS AT VARIOUS AGES

Breed.	Age.	Liveweight.	Carcase weight.	Offal.
Flemish Giant	8 weeks	4 lbs.	51%	49%
,, ,,	10 weeks	5 lbs.	55%	45%
,, ,,	6 months	7 lbs. 8 ozs.	60%	40%
Belgian Hare	14 weeks	4 lbs.	60%	40%
,, ,,	adult	7 lbs.	58%	42%
Flemish-Belgian	4 months	4 lbs. 6 ozs.	63%	37%
Black and Tan	4½ months	3 lbs. 10 ozs.	65%	35%
,, ,,	adult	4 lbs.	66%	34%
Silver Grey	,,	5 lbs.	65%	35%
Havana	4½ months	4 lbs. 5 ozs.	64%	36%
,,	adult	4 lbs. 14 ozs.	67%	33%
Japanese	4½ months	5 lbs. 6 ozs.	66%	34%
,,	adult	7 lbs.	68%	32%
Dutch	4 months	3 lbs.	70%	30%
,,	adult	4 lbs.	69%	31%

To keep rabbits beyond the right moment is equally wasteful, because every pound of food consumed without producing a definite increase in weight is so much money thrown away. If the Giant varieties give a carcase which is too large in size for the breeder's table when mature, the obvious course is to cultivate a smaller breed which produces the type of animal required.

Table rabbits are usually killed by holding them by the hindlegs head downwards, stunning them with a blow behind the ears given with a stick or the side of the hand, and then immediately severing the carotid arteries and jugular veins by cutting the throat or sticking a sharp knife into the sides of the neck just behind the ears. An incision is made between the bone and tendon of one hock through which the other foot is slipped. By the loop thus formed the animal is hung to a hook to facilitate cleaning.

The rabbit must be disembowelled immediately it is killed, and this is performed in table rabbits (as distinct from fur rabbits) by cutting a longitudinal slit of about 4 inches in the centre of the belly, care being taken not to puncture the intestines in the process. The intestines fall out easily, and must be cut through at each end and removed. The heart, lungs, liver, and kidneys are left in the carcase. The inside of the rabbit is sponged out with a weak solution of vinegar and water, a wooden skewer is placed across to keep the body open, and the carcase is left hanging up to cool and stiffen.

Some hours later (say, eight hours, but much depends upon the temperature of the place in which they are hung), when they are perfectly cold and stiff, the rabbits are ready for despatch by rail or otherwise. For a railway journey they should be packed in a ventilated box or hamper. A deep receptacle, which will take the carcases hung on a pole passed across it, is the best type to use, as bruising and heating are less likely to occur if by chance delivery is delayed; but many breeders simply lay the rabbits in a box and wedge with paper to prevent bruising.

When rabbits are being bred for fur, they are marketed in the Ostend style. The method of killing and skinning has already been described in the previous chapter. The newly skinned rabbit is disembowelled, washed, and possibly shaped. The toes are chopped off each foot, leaving a few inches of fur below the hocks. The forefeet are tucked into slits made between the first and second ribs. Shaping, if it is done, is carried out by placing the still warm carcases in rows on wide shelves and laying across them a board, 6 to 7 inches wide, weighted with bricks, to press out the thighs and give them a fictitious appearance of plumpness. When the carcases are quite cold they are ready for sending to market. Each one should be wrapped in grease paper and packed carefully in a ventilated box lined with paper to prevent dust and dirt drifting in and sticking to the flesh. The carcases are apt to bruise in cheap, flexible hampers, so that unless good substantial baskets of an expensive character are used, light boxes with slatted lids are preferable. It is important when sending by rail to fill the package, or to so wedge it up with crumpled balls of clean paper that the carcases do not shake or roll about.

It is not advisable to kill rabbits in very hot weather. In the summer comparatively cool mornings should be chosen and the consignment despatched in the evening. Fur rabbits, giving the Ostend style of carcases, will in any case only be killed between about November and April.

Drugs must never be put into the food of rabbits shortly to be killed for table purposes. If the animals cannot be reared on a simple and well-balanced dietary, they are not worth feeding at all.

CHAPTER V

THE GROWTH OF RABBITS

THE rate at which rabbits grow is a matter of such practical importance to the breeder of table rabbits that the subject will be dealt with in some detail.

The wild rabbit rarely exceeds an adult liveweight of about 3 lb., and although no details of its growth are available, it is thought to take some months to reach its full size. Several of the small fancy breeds are no bigger than their wild ancestor.

The medium-sized varieties, such as the Silver Grey, Havana, and Brabançon, grow at the rate of about ½ oz. daily, or 4 ozs. per week during the greatest growing period, with an average of 3½ ozs. per week up to 18 weeks old.

The large Giant breeds grow at double this rate, or add an average of about 8 ozs. to their weight weekly up to nearly 6 months old.

There are several varieties which it is not so easy to classify, such as the Belgian Hare, Blue Vienna or Beveren, and Japanese. They seem to come between the medium and large-sized breeds. Although rabbits of these breeds are capable of adding 8 ozs. or 10 ozs. to their weight in one week, they seldom if ever maintain this rate of growth, but drop off to 4 ozs. to 6 ozs. in the succeeding week, so that their average rate up to 18 weeks old usually amounts to only about 5 ozs. per week.

There are also possibly exceptional Flemish Giants which grow at double the rate of the ordinary type and add an average of 1 lb. weekly to their weight, such as the animals mentioned under the section dealing with the breed.

Experiments made by the present writer to ascertain whether growth is regular and continuous from day to day in the medium-sized breeds showed that it is not so, the rabbits varying from no increase at all to one of as much as 1½ ozs. in the 24 hours.

The following table shows the daily growth of one of a litter of Silver Greys, all of which were weighed daily, and gave analogous results. The rabbits were weighed first thing every morning before being fed.

DAILY INCREASE IN WEIGHT OF A SILVER GREY

	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Age in days	31	32	33	34	35	36	37	38	39	40
Weight .	1 0	1 0	1 0	1 1	1 1½	1 2	1 3	1 4	1 5	1 5½
Age in days	41	42	43	44	45	46	47	48	49	50
Weight .	1 6	1 6½	1 8	1 8	1 9	1 10	1 10½	1 11½	1 12	1 13
Age in days	51	52	53	54	55	56	57	58	59	60
Weight .	1 13	1 14	1 14	1 15	2 0	2 0	2 1	2 1½	2 2	2 2½
Age in days	61	62	63	64	65	66	67	68	69	70
Weight .	2 3½	2 4½	2 5½	2 6½	2 7	2 8	2 9	2 9½	2 10½	2 12
Age in days	71	72	73	74	75	76	77	78	79	80
Weight .	2 12	2 12½	2 13	2 14	2 15½	2 15½	3 0	3 1	3 1	3 3
Age in days	81	82	83	84	85	86	87	88	89	90
Weight .	3 3	3 3	3 4	3 5	3 5	3 5½	3 5½	3 6	3 7	3 7½
Age in days	91	92	93	94	95	96	97	98	99	100
Weight .	3 8	3 9	3 10	3 10½	3 11	3 11	3 10	3 10	3 11½	3 12
Age in days	101	102	103	104	105	106	107	108	109	110
Weight .	3 12	3 12	3 13	3 14	3 15½	4 1	4 0½	4 1	4 1	4 1½
Age in days	111	112	113	114	115	116	117	118	119	120
Weight .	4 3	4 2½	4 3	4 3	4 2½	4 2½	4 2	4 3	4 3½	4 3½
Age in days	121	122	123	124	125	126	127	128	129	130
Weight .	4 5	4 5½	4 5½	4 5½	4 5½	4 5	4 7	4 7½	4 8	4 9
Age in days	131	132	133	134	135					
Weight	4 9½	4 9½	4 9½	4 10½	4 10½					

CAUSE OF GROWTH

Growth depends chiefly upon the multiplication of cells. It seems that in rabbits the medium-sized breeds double the rate of cell multiplication as compared with their wild ancestors, and therefore grow to twice the size; while in

Giant breeds cell production takes place at double the rate that it does in the medium-sized breeds.

Admitting this hypothesis, we may further surmise from the data available that the processes by which cells are increased, both as regards the number produced and the rate at which they are formed, is hereditary. It therefore follows that rabbits of a definite size can only be produced by breeding from stock with the hereditary capacity for producing young of the required size. In other words, heredity, not food controls size.

FOOD AND GROWTH

It is not possible by any method of feeding to grow a Polish rabbit into a Giant, or to in any way influence the ultimate adult size of the animal. It is possible by very liberal feeding, which keeps young rabbits exceedingly fat, to get abnormal weights at given ages; but the adult rabbits will ultimately be no bigger or heavier than the average of their breed or strain.

"Management" or feeding has less influence upon adult size than is generally supposed. It is useless to buy small rabbits and expect by feeding to raise a large race from them. Large size must be selected for and animals must be obtained which have a capacity for rapid and multiplex cell formation.

In one way, however, the feeder has a limited amount of control, and that is if he underfeeds so that growth takes place very slowly. And by under-feeding is meant not only food insufficient in amount, but, what is far commoner, *inferior*, and of a quality which does not supply the young rabbits with the ingredients required to make rapid growth.

Although as already hinted growth is strictly limited by heredity, and no animal grows beyond a predetermined size, there seems to be little doubt that if the absorption from the digestive area is insufficient for the mass the animal ceases to grow at the best rate of which it is capable owing to its cells being insufficiently nourished, with the result that a stunted, badly developed, backward rabbit is produced.

It is generally admitted that those ingredients of a food called *albuminoids* or proteids are the ones which are most necessary to enable a young animal to make the best growth of which it is capable, and that unless the proportion of the albuminoids bears a definite relation (at least 1 to 4) to the carbohydrates, or heat and energy givers, in the ration used, the growing rabbits will not be receiving all that they require.

The French have shown that young animals have a peculiar faculty for fixing albuminoids. When a growing youngster assimilates 1 oz. of fat, its liveweight augments merely by 1 oz.; but when it assimilates 1 oz. of albuminoids, it at the same time and in conjunction with it fixes 3 ozs. to 4 ozs. of water, so that its total gain in liveweight is 4 ozs. to 5 ozs. This fact indirectly points to the necessity of supplying drinking water as well as an abundance of green food to growing rabbits, and the desirability has also been amply proved in experiments carried out with larger animals.

The economic rearing of table rabbits cannot therefore be successfully conducted unless (1) rabbits are fed in such a way as to promote the greatest growth of which they are capable at as small an expenditure and in as short a time as possible, and (2) are killed at the moment when their further maintenance becomes unproductive.

(1) It is many years since the present writer discovered that it was impossible to rear table rabbits profitably if oats were used as the concentrated food. Useful as the oat is for feeding adult rabbits, the average percentage of albuminoids is too low for the requirements of growing youngsters of the larger breeds, and the result is that, except when a large quantity of spring grass is available as well, the youngsters of the big breeds go thin on this cereal even if receiving it in quantities which leave no profit to the feeder; and they take a long time to reach maturity.

Two large young cross-bred rabbits from 9-lb. parents were fed from the age of 4 to 12 weeks on grass, hay, roots, and garden greenstuff, with oats as the only concentrated food. They consumed oats at the rate of 1 oz. per head daily for the first two weeks, 2 ozs. per head daily for the next two weeks; 5 ozs. between the two for the last four weeks; or a total of about 14 lbs., costing 1/4. The rabbits, after a period of great leanness, ended in fair condition, and would no doubt have been ready for the table at 16 to 18 weeks old after being fattened. There would not, however, have been much if any profit, for when sold for breed-

WEEKLY INCREASE IN WEIGHT OF YOUNG RABBITS OF DIFFERENT VARIETIES

Year.	Breed.	Sex.	Age in Weeks.																						
			3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
			lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.
1908	Common Cottager's	Buck	—	1 1½	1 4½	1 9	1 13½	2 4	2 7	2 13	3 5	3 12															
1908	Common Cottager's	Doe	—	1 0	1 2½	1 7	1 12	2 2	2 6	2 12	3 3½	3 10½															
1909	Pedigree Silver Grey	Buck	—	0 15	1 4½	1 9	1 15	2 2½	2 7½	2 13	2 15	3 3	3 6	3 8½	3 12	3 14½	4 0½	4 3½	4 4								
1909	Pedigree Silver Grey	Doe	—	1 0	1 4	1 9	1 14	2 2	2 6½	2 12	3 0	3 5	3 8	3 10	3 15½	4 2½	4 3½	4 5	4 10½								
1915	Havana (small type)	Buck	0 14	1 5	1 8½	1 12	2 2	2 5½	2 9½	2 11	3 1½	3 3½	3 6½	3 7	3 13	3 15	3 15	4 4									
1915	Havana (small type)	Doe	—	—	—	—	1 10	1 14	2 3½	2 8	2 13	3 2½	3 7	3 9	3 12½	3 15	4 2	4 2	4 7½	4 7½	4 9½	4 12	4 10½	4 12½	4 15	4 13½	5 1
1915	Havana-Himalayan	Buck	0 6½	0 9½	0 15	—	1 7½	1 11½	1 14	1 15½	2 5	2 10	2 13½														
1915	Havana-Himalayan	Doe	0 7½	0 10	0 14½	—	1 8½	1 11½	1 14	1 15½	2 5	2 10	2 12														
1915	Pedigree Belgian Hare	Doe	—	—	—	—	2 6	2 10½	2 14½	3 4	3 6½	3 9	3 13½	4 2½	4 7	4 6½	4 14	4 12½	4 14½	5 1	5 6	5 2					
1916	Pedigree Silver Grey	Buck	—	0 10½	1 0½	1 5	1 10½	1 13	2 2	2 4½	2 11½	2 12															
1916	Pedigree Silver Grey	Doe	—	0 9½	1 0	1 5	1 10	1 13	2 1½	2 4	2 8	2 11½															
1916	Havana (small type)	Buck	—	—	—	1 8	1 10½	2 0	2 3	2 9	2 13	3 1½	3 6	3 7	3 10	3 13											
1916	Blue Beveren (Brabançon)	Buck	—	—	—	1 7	1 11	2 0	2 4½	2 8	2 15	3 5															
1916	Blue Beveren (Brabançon)	Doe	—	—	—	1 1½	1 5	1 8	1 10½	1 14	2 2	2 3½															
1916	Blue Beveren (Giant)	Buck	0 14	1 4½	1 13	2 4	2 10½	2 15	3 5	3 9	3 12	3 14	4 1														
1916	Blue Beveren (Giant)	Doe	—	—	—	—	2 7	2 10	3 0	3 5	3 8	3 13	4 0														
1917	Havana (large type)	Buck	—	—	1 1	1 9	1 13	2 2	2 6	2 13½	3 0	3 4	3 6½	3 11	4 0	4 4	4 5	4 6	4 10	4 11	4 14	4 13	5 1				
1917	Havana (large type)	Doe	—	0 13	1 2	1 10½	1 15	2 6	2 14	2 15	3 3	3 9½	3 9½	4 0	4 3½	4 11	4 11	5 0	5 2	5 6	5 10	5 10	6 0				
1917	Japanese	Buck	0 8	0 11	0 15	1 6	1 12	2 2	2 6½	2 12	3 1½	3 5	3 13	3 13½	3 14	4 5	4 8	4 6	4 8	4 11							
1917	,,	Doe	0 8	0 12	1 2	1 8½	1 14	2 3½	2 9	2 15½	3 5	3 9	3 9	4 1	4 1	4 1	4 2½	4 15	4 15	5 0							

ing purposes at 12 weeks old it was estimated that the profit on the whole transaction was the magnificent sum of 6*d*.

RATE OF GROWTH

The table on page 58 gives the rate of growth of a number of rabbits of various breeds.

The table is divided up into years for the purposes of fair comparison. It is impossible to get precisely similar conditions in different years. The quality of the food varies according to the nature of the season, the temperature differs and may influence results, and so forth, any of which factors may lead to incorrect deductions if unallowed for. The weights given are those of healthy rabbits, well fed, and presumably growing at the best rate of which they are capable, and in most cases running together, or at any rate kept under conditions which were as nearly identical as it was possible to secure.

Champagne Silvers were also weighed regularly in 1917, but as the youngsters had colds when received, and were not for some time in a perfectly healthy condition, their weights are not recorded. Their rate of growth when in improved health was about the same as that of Japanese.

Many young rabbits almost, if not quite, cease to grow temporarily at about the ninth or tenth week. At this period they markedly change in shape, losing any babyish rotundity they may possess, and, in the case of the large breeds, becoming very narrow and slab-sided. The change of shape and the temporary disorganisation are probably due to a change of position of some of the internal organs, and this period is most likely a critical one in the lives of the ill-fed.

(2) With reference to the age at which it is most profitable to kill table rabbits, in animals of this species, as in all others, growth is most rapid in early life, and under normal conditions the older the rabbit becomes, the longer is the time taken by it to increase 1 lb. in liveweight.

The table on page 60 illustrates the point:

Although this table serves to illustrate the fact that growth slackens as age increases, it does not show one important point, and that is the stage of maturity of the individuals at a given age. As a matter of fact, the Blue Beveren and Japanese, although they reached 4 lbs. weight in 70 and 69 days respectively, compared to from 78 to 98 days taken by rabbits of smaller breeds, were actually far off being as nearly ready for the table as the other rabbits specified at a similar age. In other words, the smaller breeds grew and fattened at the same time and could have been killed without great loss at any time after they were about 3 months old, whereas the big, quick-growing, but slow-maturing breeds were largely frame and offal at that age, and did not begin to put on much flesh or "fill out" until at least 4 months old. The rapidity with which a rabbit can be put on the table seems to be in precisely inverse ratio to the rapidity with which it grows. The Havanas reared in 1917 were more mature at 3 months old than the Japanese reared with them were at a month older.

NUMBER OF DAYS TAKEN BY RABBITS OF MEDIUM-SIZED BREEDS TO INCREASE 1 LB. IN LIVEWEIGHT

Breed and Sex.	1 to 2 lbs.	2 to 3 lbs.	3 to 4 lbs.	4 to 5 lbs.
Silver Grey Buck . . .	20	27	36	—
,, ,, Doe . . .	24	25	29	—
Havana Buck (small type) . .	28	28	42	63
Blue Beveren Buck . . .	21	21	28	—
Havana Doe (large type) . .	18	21	21	28
Japanese Doe	21	21	27	42

Taking everything into consideration, most of the medium-sized breeds should be put up to fatten (if they require it) at about 15 weeks old for killing three weeks later, and the Giant breeds at from 21 to 23 weeks old for killing at the age of 24 to 26 weeks, if they are to be put to the best economic use from the point of view of both producer and consumer.

As to the amount of food required to produce 1 lb. increase in liveweight, various observations on this point seem to show that on an average it takes from 12 lbs. to 16 lbs. of a well-balanced ration to produce 1 lb. increase in liveweight in small and medium-sized varieties. Of this amount probably between 6 and 7% at least will have to be concentrated food.

FATTENING RABBITS

Rabbits are fattened by giving them a dietary almost exclusively composed of carbohydrate or fat-forming foods. An unbalanced dietary of this nature if persisted in will ultimately lead to ill-health, and the period during which rabbits can benefit is limited to about 3 weeks, after which they usually cease to improve and may possibly go back. Therefore, if in spite of proper feeding a full-grown rabbit is not fit to kill at the end of 3 weeks of fattening, it is waste of time, money, and material to keep it longer.

The following is a French fattening dietary, all other food being withheld:

First week, about 15 ozs. per head daily, comprising:

Morning:	Cooked potatoes	2½ ozs.
	Bran	2½ „
	Milk	2¼ „
Noon:	Cooked maize	5 „
Night:	Oats	2½ „

Second week, about 16 ozs. per head daily:

Morning:	Dried beet pulp	2½ ozs.
	Dried grains	2½ „
	Barley meal	1 „
	Milk	2¼ „

Noon and night same as above.

Third week, about 1 lb. 6 oz. per head daily:

Morning:	Cooked potatoes	4 ozs.
	Barley meal	1¼ „
	Linseed cake	1¼ „
	Milk	5¼ „
Noon:	Cooked maize	5 „
Night:	Bread and milk	2½ „
	Oats	2½ „

In cold winter weather a little additional oats or maize is given.

CHAPTER VI

HUTCHES AND APPLIANCES

THE first and most important part of the equipment of the rabbit breeder is a dry, roomy shed or outhouse in which to keep the very bulky and untidy food and appliances.

Hay, roots, concentrated food, and possibly straw, all highly perishable articles which must be kept free from damp and extremes of temperature, are so much more cheaply obtained if purchased in bulk in the early autumn that it will pay any one with three or more rabbits to provide suitable accommodation for their food. Although some of these things occupy space during the winter only, the breeder who keeps pure varieties and sells breeding-stock will at all times have to house a supply of boxes suitable for despatching stock to purchasers, and if he exhibits, there will be other boxes and baskets which will also require storing.

A disused stable makes an ideal rabbitry. Food and appliances can be kept in the loft, the breeding-stock in hutches in the coachhouse if supplementary wire-netting doors are fitted to admit light and air, and each stall, closed in at the end, will accommodate up to ten youngsters, nothing being required but a packing-case for the animals to lie in or on off the brick or concrete floor.

ASPECT

Whether the rabbit hutches stand indoors or out of doors is of small importance in the South of England as far as the rabbits are concerned. In bad weather, however, the necessary work is less likely to be scamped if the attendant has a roof over his head. A roof with open sides and ends requires to be made of very good material and much more powerfully constructed and fixed than a closed-in shed if it is to stand in a garden or any open place where it is at all likely to catch the wind.

Rabbits suffer from heat and become debilitated, and youngsters become large in ear and even lop-eared if unduly exposed to the sun in summer. Hutches should, therefore, never stand against a south wall unless shade in summer is provided. Probably the best aspect for out-of-door hutches in the South is due east, for the animals get the benefit of the morning sun to warm them up after a cold night. When the hutches face due west, the evening sun streams into them in the summer evenings just at the time the rabbits desire to feed, which is not desirable. Hutches placed to face due south do not get the sun shining right into them at midsummer, so that this aspect is satisfactory if they stand in the open well away from a wall or building. The best position of all is probably facing south beneath deciduous trees and well-sheltered on every other side.

The breeder must study local conditions and the prevailing winds of his district. In many of the northern and more exposed parts of these Isles, an outhouse in which to keep the stock is almost a necessity ; but it is impossible to lay down any hard-and-fast rules or do more than indicate what is desirable for the welfare of the animals.

HUTCHES

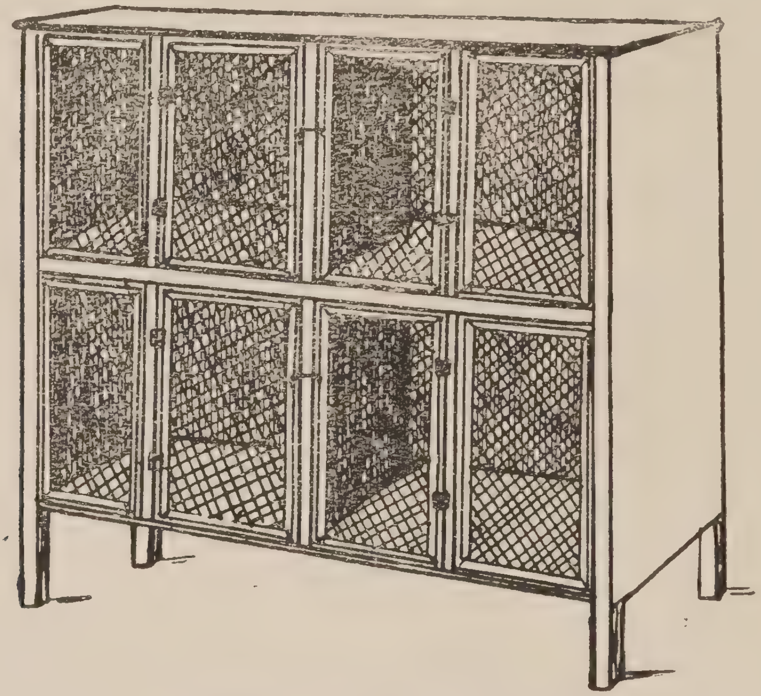
Whether they stand in an outhouse or out of doors the size of the hutches will be the same. A minimum size for small and medium-sized breeds is 4 feet long, 2 feet wide, 1 foot 9 inches high. Large breeds, 7 lbs. and over in weight, should have hutches 2 feet longer. A greater width than 2 feet is inconvenient for cleaning purposes, and a greater height than 1 foot 9 inches is unnecessary, wasteful of material, and, in the case of three-tier stacks, undesirable, because it makes the upper hutches inconveniently high.

All hutches should be made on the box principle of well-seasoned matchboarding, $\frac{3}{4}$ inch thick, if they are to stand out of doors. Thinner wood can be used if they are to stand in a good outhouse.

The chief difference between an indoor and outdoor hutch lies in the front, which must be at least half wood in the latter, and provided with a shutter over the wired part to afford protection from wet, and shade in sunny weather.

Indoor hutches can have all-wire fronts, the size of mesh in every case being ½ inch, which is reputed mouse-proof, and is not easily torn off either by the rabbits or their enemies. It is desirable to have the fronts so arranged that the rabbits can see out, as they enjoy viewing the world, and are benefited by the mental occupation afforded.

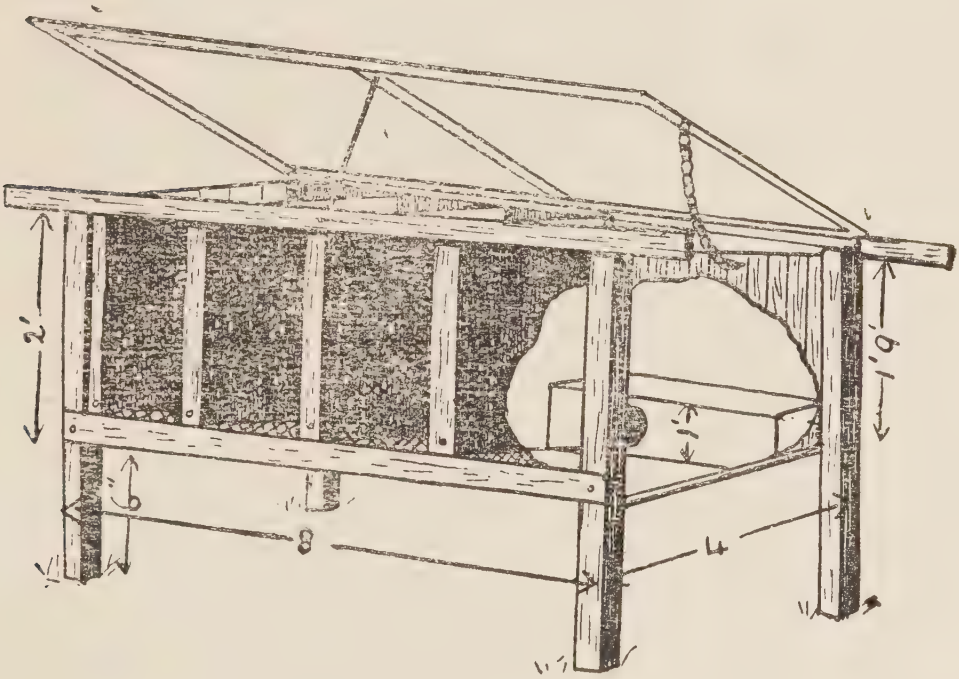
The most economical design is a three-tier hutch. The accompanying diagram shows a useful type of hutch made to the writer's design some years ago, which will probably meet all the requirements of the average rabbit breeder. Hinged partitions between each compartment are strongly recommended, as it is a great convenience to be able to convert two single breeding-hutches into one large one to accommodate a doe with a very large litter, or up to ten weaned youngsters.



A USEFUL TYPE OF HUTCH

Very large stacks need to be made in sections to fasten together with bolts and nuts if they are to be portable. A two-tier hutch is as much as two persons can handle without much difficulty.

Such a stack, if made to stand out of doors, must have solid wood panels instead of wire netting, and shutters to fit over the doors. The roof must be sloped to the back, and be covered with felt or some other roofing material. All hutches must be raised off the ground on legs, and they should stand slightly away from a wall, so as to allow air to circulate all round them. Nothing equals a solid wood floor tarred and sanded before being put into use and kept strewn with sawdust. Drainage systems never answer for long, and are always giving trouble. Wire-netting floors to hutches on legs are quite unsuitable. As in the case of wood-slatted floors, food and bedding fall through and are wasted; and in addition, wire-netting floors are far too cold for outdoor hutches in winter. In rabbitries where expense is no object the French advocate double floors, *e.g.* wooden slatted floors raised an inch or so above trays into which the excrements fall. Their use in conjunction with an elaborate type of food and water vessels which can be filled from outside the hutch, do away with the necessity for putting the hands inside—and this is a point of great advantage in the case of some of the very bad-tempered foreign breeds.



A FRENCH TYPE OF HUTCH

Another French type of hutch for outdoor use for medium-sized breeds, here illustrated with modifications, seems to possess some advantages. The four-compartment design shown is 8 feet by 4 feet, and has movable divisions so that the hutch can be converted into two large or one very large pen if desired. The nesting compartment is also formed of a sliding board with a hole in it, and is covered by a movable shelf or lid upon which the rabbit can lie. The great point in hutches of this shape is that the inmates are less exposed to the light than they are in shallow designs. Light deteriorates the colour of all varieties more or less, and some breeds, such as Himalayans, cannot be exhibited with any hope of success unless kept in semi-darkness.

Hutch doors should always be made to fit *inside* the opening, otherwise there is a perpetual shower of sawdust on to the floor whenever the door is opened. They must be well hinged and furnished with hook-and-eye fasteners in preference to turn buttons, which frequently come undone.

However simple and inexpensive a rabbit hutch may be, attention to detail in the matter of fittings will add so materially to the ease and rapidity with which the animal's wants can be attended to that it is a matter worth taking trouble about.

Nest Boxes

Whether a space of 1 foot is partitioned off at one end of the hutch or whether a movable nest box is used is more a matter of fancy and convenience than of practical importance as far as breeding results are concerned. The chief point is that rabbits, which naturally make their nests in holes in the ground, must be provided with some sort of substitute if the best success is to result. They will and do make nests in a corner of the hutch in the breeding-season; but the proportion of losses is great under this system, and the number of young reared in an inclement winter, or out of the natural breeding period, is exceedingly small.

As rabbits do not normally make much use of a nesting compartment except for breeding purposes, it is so much space and money wasted to permanently partition off a portion of the hutch, provide a second door, etc. The partition should slide out, turn back, or hook up out of the way when the nesting chamber is not required.

Movable nest boxes made from common boxes purchased at the grocers' are in every way more desirable. A size of about 16 inches by 13 inches by 9 to 11 inches high, or thereabouts, is suitable for all breeds up to about 7 lbs. weight. The lid should be roughly hinged to keep it in position (two rings of wire will do) as the rabbit will probably spend more time on the top of the box than inside it, and a circular hole about 6 inches in diameter should be cut in the centre of one end.

STUD BUCK HUTCHES

Many breeders are under the impression that a small hutch is suitable for a stud buck. This is a mistake, however, for this important animal needs exercise as much as, or even more than other rabbits if he is to keep in the firm, hard condition indicative of fertility. The buck's hutch should be at least 4 feet by 2 feet for the medium-sized breeds, and furnished with a movable shelf upon which the animal can lie. The hutch should stand, say, 2 feet 6 inches or 3 feet from the ground, so that the rabbits can be conveniently handled by the attendant.

If a valuable rabbit is placed at stud, it will be desirable to have a long hutch with a frame covered with ½-inch-mesh wire-netting hinged to the roof in the centre of it. This is hooked up when the buck is alone, and let down and the doe put into one half of the hutch for a few hours prior to mating. Fanciers of experience believe that the very real risk which is entailed when mating some does is minimised if the rabbits are able by this means to make acquaintance before being actually put together.

The buck's hutch should have no projections and all fittings should be removable. A very convenient and useful form of pen to be used for mating only is a circular bin or tub. This used to be much in favour amongst keepers who bred rabbits, and the advantage of a perfectly circular mating-pen will be readily understood by all those who have had much experience of rabbit breeding.

NUMBER OF HUTCHES

Every adult rabbit requires a hutch to itself, and there should be one rearing-hutch to every adult doe's hutch.

PENS FOR YOUNGSTERS

Rearing-pens or hutches should be numbered to correspond with the does' hutches, so that for the sake of simplicity of identification each doe's litter can be transferred to the same hutch or pen when weaned.

A certain amount of amalgamation will be necessary when the period comes to separate bucks from does, but by that time the best rabbits will be known by sight, and it may be possible to put individuals which are to be killed together. Possible difficulties of identification only seriously apply in the case of self-coloured fur breeds, which are, or ought to be, so alike that individuals are difficult to distinguish.

Many English breeders have tried and failed to rear great numbers (from 20 to 80) of young rabbits together in large pens or sheds. It seldom answers, and the experience of the French is that more than ten individuals cannot be reared together successfully.

The minimum size of pen for this number is, in their opinion, about 4 to 5 yards in width and breadth.

RABBIT FENCING

A 3-feet-high wire-netting fence, 1¼-inch mesh, will keep in rabbits if a flap 6 inches wide is turned in at the top. Such a fence is sufficient if used on any hard substance, such as a wood or stone floor, if the wire is attached at the bottom to battens to prevent the rabbits from lifting it.

For pens made on the soil out of doors, or for the fencing of an area for a warren, patent mixed mesh netting, 18 gauge, should be used. The lower 18 inches is composed of 1¼-inch mesh, the upper 30 inches of 1½-inch mesh. This gives wire of 4-feet width, 6 inches of which is turned in and laid flat on the ground at the bottom, and 6 inches turned in as a flap at the top and held in position by being tied to a wire run through 7½-inch bolts driven into the stakes. At normal average prices such a fence may cost from 2/– to 3/– upwards per yard to erect on good 3 to 4-inch square posts. The larch or oak posts should be about 5½ feet long, the bottoms charred, and they should be placed 3 feet apart and sunk 18 inches deep. When the netting is fixed from the ground upwards, a foot length of post is left standing above the wire-netting. On to the outside of these is stapled, 2 inches from the top, a strand of barbed wire; 9 inches from the top a line of No. 4 strand wire. This fence is reputed to be cattle proof and to turn a fox.

The alternative to the turning in of a flap of wire all round the top of the fence is, of course, to roof the pen all over with 2½-inch-mesh netting.

Young rabbits, especially those of the fur breeds, which are the ones which have to be kept the longest, can be reared in pens in the open if good huts are provided; but it is better to make the pens in an outbuilding, or place them at right angles to a wall out of doors with a lean-to roof covering them. If the roof is made 5 feet 6 inches to 6 feet high at its lowest part for the convenience of the owner, it will be sufficient if 2½-inch-mesh netting is used to cover the sides from 4 feet off the ground to the roof. In very cold localities further protection should be given by providing boxes set on their sides, or (especially if the floor is of concrete) a narrow wooden floor with a wooden roof placed about a foot above it, where the animal can lie.

Duck houses, or some types of poultry coops and pens adapt well as huts for rabbits, the chief point being to secure structures which are warm, water-tight, sufficiently roomy, and easy to clean out.

Cockerel pens make excellent houses for breeding does or young rabbits, either stationary and set on a concrete floor, or wired over the bottom with 1½-inch-mesh netting and used as movable pens on the grass in summer. The chief objection to the use of these and other poultry appliances is that they generally cost far more than ordinary rabbit hutches. It is as important in rabbit breeding as in any other undertaking of a similar character to keep the capital expenditure as low as is reasonably possible.

OTHER SYSTEMS

There are no practicable systems of rabbit keeping other than those mentioned in this book. It is possible to keep breeding stock in large enclosures, allowing them to breed promiscuously, but the measure of success is likely to be very small, and interesting as such experiments are, they cannot be recommended as serious undertakings suitable for people interested in the economic production of rabbits for flesh and fur.

PROTECTING METAL ROOFS

Galvanised iron roofs are quite unsuitable either for rabbit hutches or outhouses in which hutches stand. They make the structure too hot in summer and condense moisture in cold weather which falls on the animals or food supplies. Outhouses with metal roofs can be kept comparatively cool in summer if scrim canvas or sacking is nailed to a frame made of battens fixed a few inches above the metal roof. Or better still if straw or reed is laid several inches deep on the roof and held in place by a sheet of wire-netting fastened down to the sides and ends of the house, the offending roof will not give trouble. If birds are not prevalent, a fairly large mesh can be used to hold the straw in place, and as it will rot and will probably want renewing annually, the wire should be tightly stretched to hooks so that it can be easily lifted off and replaced.

PRESERVING WOODWORK

Hutches which stand out of doors should be treated with one of the well-known wood preservatives such as " Stop Rot," " Solignum," etc., a coat every year until three have been applied being sufficient to prolong the life of the hutch to the greatest extent possible. Failing this, the hutches should be painted not less than every third year with a good quality of paint for outdoor use. Felt roofing material should be tarred both sides (or rather the roof it is to be laid on should be tarred first and the felt put on to the wet tar), and sanded outside when first laid on, and again annually.

If pieces of slate are placed under the feet of outdoor hutches their life will be materially prolonged ; and the necessity of tarring and sanding the floors and sides for 6 inches up has already been alluded to.

Rabbits are at times very destructive to woodwork. The trouble is possibly due to discomfort caused by overgrown teeth or digestive disorders. The offending animal should be given split cabbage stumps and ash boughs to gnaw. A painting of paraffin oil over the place attacked may help to prevent further destruction ; but if the rabbit starts on a fresh place, an old tin must be procured and cut into strips of varying widths which can be bent over a table edge to the shape desired. If a small hole is punched with a bradawl at each end of the strip, it can be fixed in the position required with tin-tacks. When the job is neatly done, the repair of the destruction will hardly be noticeable after the hutch has been re-whitewashed.

Whitewash

Hall's Sanitary Distemper is most commonly used for the insides of hutches, and is so convenient and easy to apply in varying strengths to suit the circumstances that it can hardly be improved upon except in the matter of expense. A new hutch should receive a thick coat, then once annually as a matter of routine, or at any time following a case of disease a thin coating can be given over the whole interior, not omitting roof, floor, and wire-netting.

Whitewash is much cheaper, and can be made as follows : Take 1 lb. of whitening, and a handful of powder disinfectant. Pour on boiling water until it becomes a thin paste ; or place it in a bucket and cover with water overnight, and next morning pour off the water carefully and beat up the remaining creamy material. If liquid disinfectant is preferred, now add one teaspoonful of carbolic acid. Place 2 ozs. of size in a little water in a vessel on the fire and stir till melted. Pour this into the whitening, add some laundry blue to colour if desired, and one tablespoonful of alum ; beat the mixture thoroughly, and it is ready for use.

Protecting Fronts

Hutches with wooden floors and open-fronted runs, and without proper shutters, which stand out of doors, need protection from rain driving in and wetting the floors. Thin sacking or any material of an absorbent nature should never be used, because if it gets wet and the wind blows through it, the temperature of the hutch will be reduced many degrees, and the rabbits will probably get chilled. Such material as is used for rick cloths, waggon covers, etc., may do if furnished with rings at the top and bottom and made to run on two tightly stretched wires which will enable the curtains to be pulled in front of the open part of each hutch front in wet or cold weather.

Troughs and Racks

As rabbits invariably scratch out their food and also have a propensity to upset the food vessels, it is essential that a design of trough be selected which frustrates their efforts in these directions. Heavy earthenware pots with flanged edges are specially manufactured for rabbits, but the cost of carriage makes them come rather expensive to breeders who live far away from the pottery districts. Failing these, glazed flower-pot saucers, or glass vessels in which ox tongues are sold, serve the purpose, although they do not totally prevent waste. If given a bare, clean hutch floor, and a limited amount of concentrated food, a rabbit will usually eat up whatever it scratches out.

Metal troughs made on the design commonly in use in bird-cages, which can be thrust through and fit over holes cut in the hutch fronts and are held in place by turn buttons, are inexpensive and admirably suited to the needs of rabbits if made with turned-in edges. A rabbit should never be expected to put its head through an opening to reach a trough fixed outside, for, apart from the risk of accidents, this type is quite unsuitable and would have to be put out of use when there were young rabbits in the hutch.

Long wooden troughs, made by putting two battens at right angles and fixing them with cross pieces at each end, are the cheapest and most useful form to use for young rabbits. To prevent the animals from sitting in the troughs it is a good plan to arch stout wires across at 4-inch intervals. The length of trough necessary for a pen of ten rabbits is about 40 inches.

The heavy earthenware or glass vessels already described are equally suitable for holding drinking water. The type of ox-tongue glass which is smaller in circumference at the base than at the top will require to be slipped into a ring of wire fastened to the hutch front or it will frequently be upset.

Barred hayracks are not always very economical, as the hay is easily pulled out if the bars are too far apart. A suitable distance is about ¾ inch. A covering of wire-netting over too widely set bars will improve matters. A cheap and quite efficient form of hay rack is made by cutting off a 2-feet length of 1½-inch-mesh wire-netting, 1 foot wide. This bent into a circle, the ends laced together, and the bottom flattened, forms a rack large enough to hold food for one rabbit if it is attached with wire to the netting of the hutch front. If a strip of wire is cut out of a wide piece, it is important to have the selvage edge for the top of the rack. For the sake of economy the racks should hang over the food troughs.

Wire-netting bags of much larger dimensions should be hung in the rearing-pens or hutches, a flat, wide, deep type, which can be pressed together at the mouth to prevent the young rabbits from climbing up and sitting in the hay, being the best.

OTHER APPLIANCES

For cleaning-out purposes a metal T-shaped flue scraper, with a 2-feet handle, or a turnip hoe (solid) with a 2-foot handle, is required, and a small shovel such as is used in connection with a coal-scuttle. The triangular form of hoe is not recommended, because lively rabbits of some of the virile foreign breeds are liable to damage themselves on the point. A small sink brush of a convenient shape is a useful but not indispensable addition, and the same can be said of a dust-pan for scraping out into. A receptacle is necessary to receive the cleanings ; they can either be put straight from a dust-pan into a wheelbarrow, or in a small rabbitry the cleanings can be scraped straight into a metal or wooden bucket.

A stiff broom for sweeping the floor will be required.

The food and water carriers should preferably be of enamelled ware or tin, as there is the possibility of zinc poisoning arising in hot weather if sour food is kept in a zinc receptacle. Wooden buckets are satisfactory, but they must be kept sweet and clean, which is not always easy. A can or jug is more convenient than a bucket for the drinking water. Tin Scout's buckets serve very well in a small rabbitry for carrying both food and water, but their capacity is limited to the requirements of about half a dozen animals. Mixing spoons should be of wood. The choice of bins for meals, grains, etc., and a receptacle for sawdust must be left to the discretion of the breeder. It need only be remarked that meals or bran should never be left for any length of time in the sack; sawdust also will have to be turned out if at all damp; and peat moss dust rots sacking in a very short time.

NUMBERING APPLIANCES

All hutches should be numbered, and each set of food and water vessels should have painted on them numbers corresponding to those on the hutch to which they belong, for one of the most fruitful causes of the spread of diseases is the promiscuous use of utensils.

DISINFECTANTS

A tin of good disinfectant in powder form, and a tin of insect powder are indispensable.

RECORD KEEPING

In a large rabbitry a card should be tacked to the front of each hutch whereon is recorded, (1) date when doe was noticed to be in heat, (2) date of service, (3) buck used, (4) date of birth of litter, (5) number born, (6) remarks. At the end of the breeding-season these cards can be collected and the data copied into a book for future reference. Such records are invaluable in the future, as they provide precise details of the value of each inmate of the rabbitry.

CHAPTER VII

THE MORANT SYSTEM

THE method of rabbit keeping known as the Morant system, from the name of its originator, is the use of movable hutches with wire-netting bottoms through which the rabbits can graze the herbage on which the hutches stand.

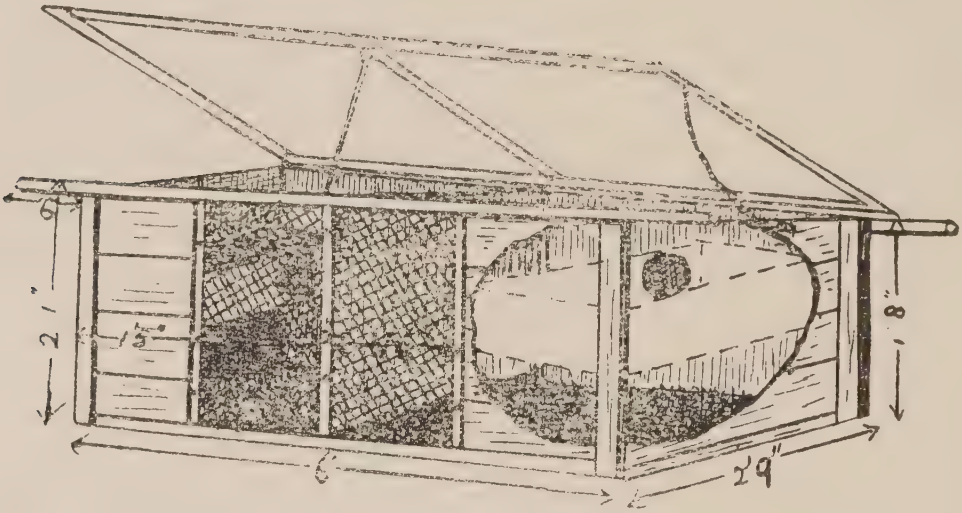
Although it is nearly if not quite forty years since Major Morant first advocated this system, it has never been adopted to any extent in England, firstly, perhaps, because it is not as well suited to the breeding and rearing of purely exhibition stock as the time-honoured method of keeping them in the box type of hutch indoors, and, secondly, because it requires land. Until quite recently rabbit breeding was almost exclusively in the hands of town dwellers whose hobby was exhibiting ; and there is no doubt that a certain amount of exposure to light and weather, good as it is for the health of the rabbits, militates against their chances in the show pen in keen competition. In France the system has been adopted on quite a large scale in some establishments, and is reputed successful. Now that rabbit keeping is becoming widely spread among all classes of the community in the British Isles, and economic qualities are taking precedence of show points, many people with land will no doubt desire to try this method.

It is the only way in which it is possible to keep very large numbers of rabbits hygienically with a reasonable amount of labour.

The accompanying diagram shows a typical Morant double breeding-hutch of the type made by Messrs. Boulton and Paul, Norwich. All the fittings slide out so that, with the centre partition withdrawn and some of the nest fittings removed, the hutch can be used, if desired, as a single rearing-pen.

This type of hutch is the most useful for all purposes, and is therefore the one recommended. There should be three to every two breeding-does kept, one hutch housing two does, the other two taking their weaned litters. Bucks' hutches can advantageously be 5 feet by 2 feet, and are best made without nest fittings. A box (which can be removed when a doe is put into the hutch) should be given to the buck to lie on and go into in cold weather.

A specification for a double breeding-hutch is as follows: Framing, 1½ inch; roof framing, 1½ by 1 inch; panelling, ¾-inch matchboarding. Roof covered by sheet of zinc. The hutch fitted together with bolts and nuts: length, 6 feet; to end of handles, 7 feet; width, 2 feet 9 inches; height in front, 2 feet 1 inch; height at back, 1 foot 8 inches. Central partition, 2 feet 7 inches wide; 2 feet high in front, 1 foot 8 inches at back.



A DOUBLE BREEDING-HUTCH

Nest box in the commercial type of hutch: Floor, 14½ inches wide, resting on ledges fixed 9½ inches from the ground at the back and front of the hutch. A board 8½ inches wide, with a hole about 6 inches in diameter, or an archway, cut at one end, slides into grooves fixed on back and front of hutch. A groove formed of two pieces of wood nailed to the centre of this board and on centre of end of hutch takes a batten which keeps the nest together.

A lid, 15 inches by 2 feet 6 inches, rests on the board and upon strips of wood fixed to front and back of the hutch. This leaves a space of about 7 inches on top of the nest box in the front part of the hutch upon which the rabbit can lie.

An improvement to this design would be to make the nest box occupy only the front half of the shelf. The advantages of this would be (1) better access to the nest box, which would then be approached from the shelf on to which the entrance hole would open; (2) a comfortable resting-place on the shelf outside the nest covered by the lid, which would prevent the moisture which condenses on the roof in cold weather falling on the rabbit. As now made, does have difficulty in carrying up hay into the nest box, and young rabbits are apt to fall out, or if they jump down when small, they are unable to find their way back again through the hole at all easily.

Owing to the height of the hutches in front, necessitated by the raised nest box, the roof is sometimes hinged to the front to enable a short person to handle the inmates easily. As a general rule it is better that the rabbits should see the attendant approaching over grass, hence most breeders prefer the roof to be hinged to the back.

The stay or prop to the roof should be screwed to the centre piece of wood of the roof framing. A light chain or cord should be attached close to the prop from roof to hutch front to prevent the former being blown back and broken in windy weather. Wrought-iron hinges should be used, as cast-iron are continually breaking unless kept well greased to prevent them becoming rusty.

The bottoms of the hutches must be covered with 1½-inch-mesh wire-netting, tightly strained round the bottom and stapled to the sides. If stapled to the bottom, the holes made assist in setting up rot, and the wire is also more liable to get dragged off.

The fronts comprise 17 inches of wood at each end, two 18-inch openings covered by 1-inch-mesh wire-netting, 18 gauge (or ½-inch-mesh netting) in the centre divided by a piece of wood 2 inches wide under which the wire stretches. It is almost essential to have shutters over the wire for use in very cold weather and when breeding. The best form is a hinged door which will turn right back over the panelled half of the front and hook there.

It is most important that only good quality and well-seasoned wood be used in the construction of these hutches.

Common, unseasoned deal and sapwood will not stand the exposure. The hutches should be painted three coats outside, and the paint renewed every third year. The insides should be distempered or whitewashed. The construction must be of the very best, as the hutches may have to withstand the onslaughts of one or other of the various enemies of the rabbit, to say nothing of the strain put upon them by the perpetual moving.

SPECIAL DETAILS

If Morant hutches are to stand in a field occupied by horses or cattle, the projecting wooden handles are quite unsuitable, and will soon get broken off. Some form of metal handle which drops down will be required ; or else the French fitting of four broad hooks fixed to the front and back of each hutch, beneath which two poles, carried round by the movers, can be slipped. As, however, one person alone may often desire to move a hutch, one end at a time, handles which drop are probably best.

Each hutch is furnished with a zinc trough with turned-in edge, 1 foot long, 2 inches deep, 4½ inches wide, back 13½ inches by 3½ inches. These troughs slip from the outside through holes 12 inches by 3 inches cut in the backs of the hutches on each side of the central partition, and are held in place by turn-buttons. A ledge of wood over each trough helps to prevent water getting into them in wet weather.

The zinc roofs of Morant hutches are far too hot in summer and condense moisture in winter. They should be protected by mats of straw, reed, matting, or some other material laid in two or more layers until the roof beneath feels fairly cool to the hand on a sunny day. Various types of mats are used for garden purposes and may be suitable ; or straw mats can be made by a groom or thatcher. The mats can be kept in place by three pieces of fine wire passed round the roof. String holds them equally well, but is perpetually being bitten through if it comes within reach of the rabbits.

Large wire-netting bags should be slung in the hutches across the centre partition to hold cut greenstuff.

OTHER TYPES OF HUTCHES

Although various designs of hutch have been advocated, the Morant type seems difficult to improve upon, and is the one adopted in France, where a pattern very much like the one described has been widely put into use. A rather more expensive class of roof, with a centre panel which slides to right and left, is in greater favour on the Continent than the lid opening used here. Failing a hutch of the original design, the next best thing is probably a pen on the combined coop-and-run principle, with hinged wooden roofs to both run and inner chamber. It is important in all hutches of this class to have the openings so arranged that the breeder can reach easily all over the pen without going on his knees on the possibly wet grass, for which reason lid or roof openings are the best. Doors at one end of a 4-foot or longer pen might as well be absent as far as ease of catching up the inmates is concerned.

DISADVANTAGES OF THE SYSTEM

One great disadvantage is the amount of capital required. A commercial Morant double breeding-hutch used to cost 33/–, which works out to a good deal more per head of stock kept than a box form of hutch of somewhat similar dimensions. The life of the hutches, too, even when as well made as they usually are at Norwich, cannot be expected to be as long as that of stationary hutches.

As experimenters often first try this system on a lawn, upon which it works excellently, they frequently fail to realise that it fails to work as well in an ordinary field which is normally full of depressions, ant heaps, and tussocks. To get the land grazed evenly and completely by rabbits, the surface must be as level as an average lawn, and this no agricultural land ever is.

On wet and heavy land, such as in low-lying situations or on clay soil, also in very exposed or cold localities, the rabbits are not likely to do well in winter. As there is very little for them to graze during the six winter months, and most of the food has to be carried to them, the chief advantages of keeping them out lie in the fact that the daily labour of cleaning out and the use of sawdust are saved.

The most desirable system in the writer's experience is to keep all the rabbits in indoor hutches or in Morant hutches fitted with wooden floors for the six winter months of the year.

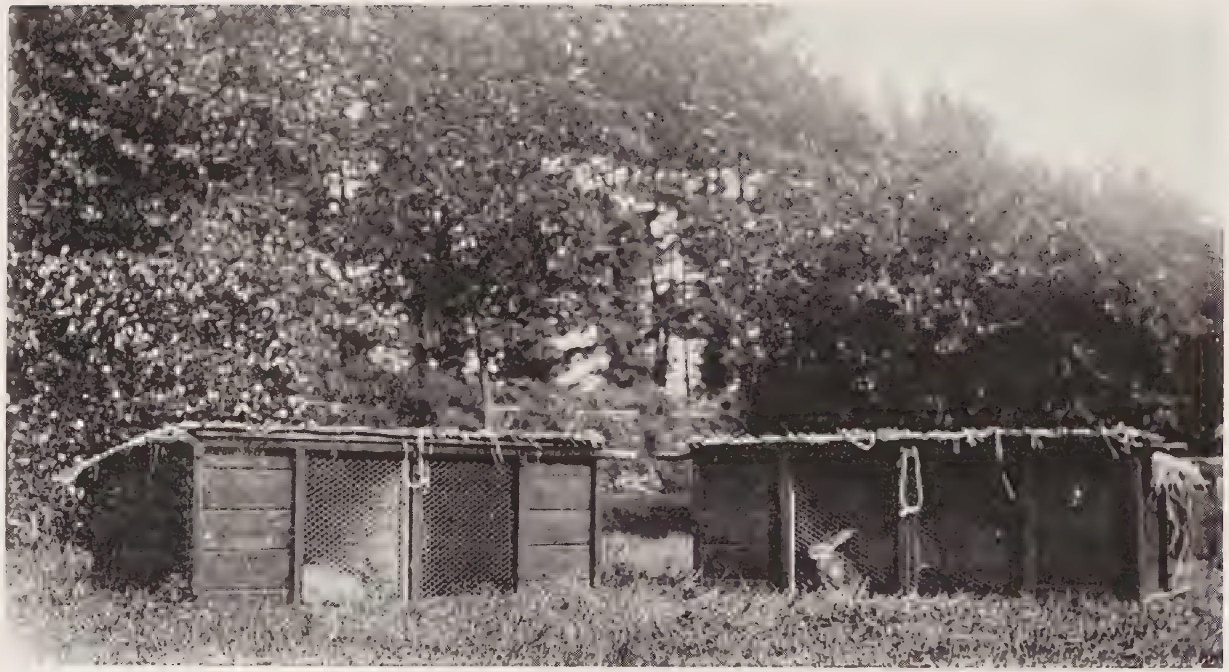
A good many casualties occur at times among breeding stock owing to the disturbance caused by other animals at large. Therefore the ideal system is to breed in ordinary indoor hutches, and draft out the young ones to be reared on the Morant system from April to October. The danger of this practice lies in the fact that (1) young rabbits are peculiarly susceptible to parasitic attacks, (2) and unless special precautions are taken, they are very likely to be exposed to infection if reared on the grass. In other respects it is the present writer's strong conviction that all rabbits thrive better and young ones grow faster and receive fewer checks on the grass in the open air during the six best months of the year than when kept in any other way.

In the spring the grass grows far faster than it is possible to consume it, therefore a good deal of scything has to be done, as the rabbits cannot pull up very long stuff through the wire, and they consequently soil more than they eat.

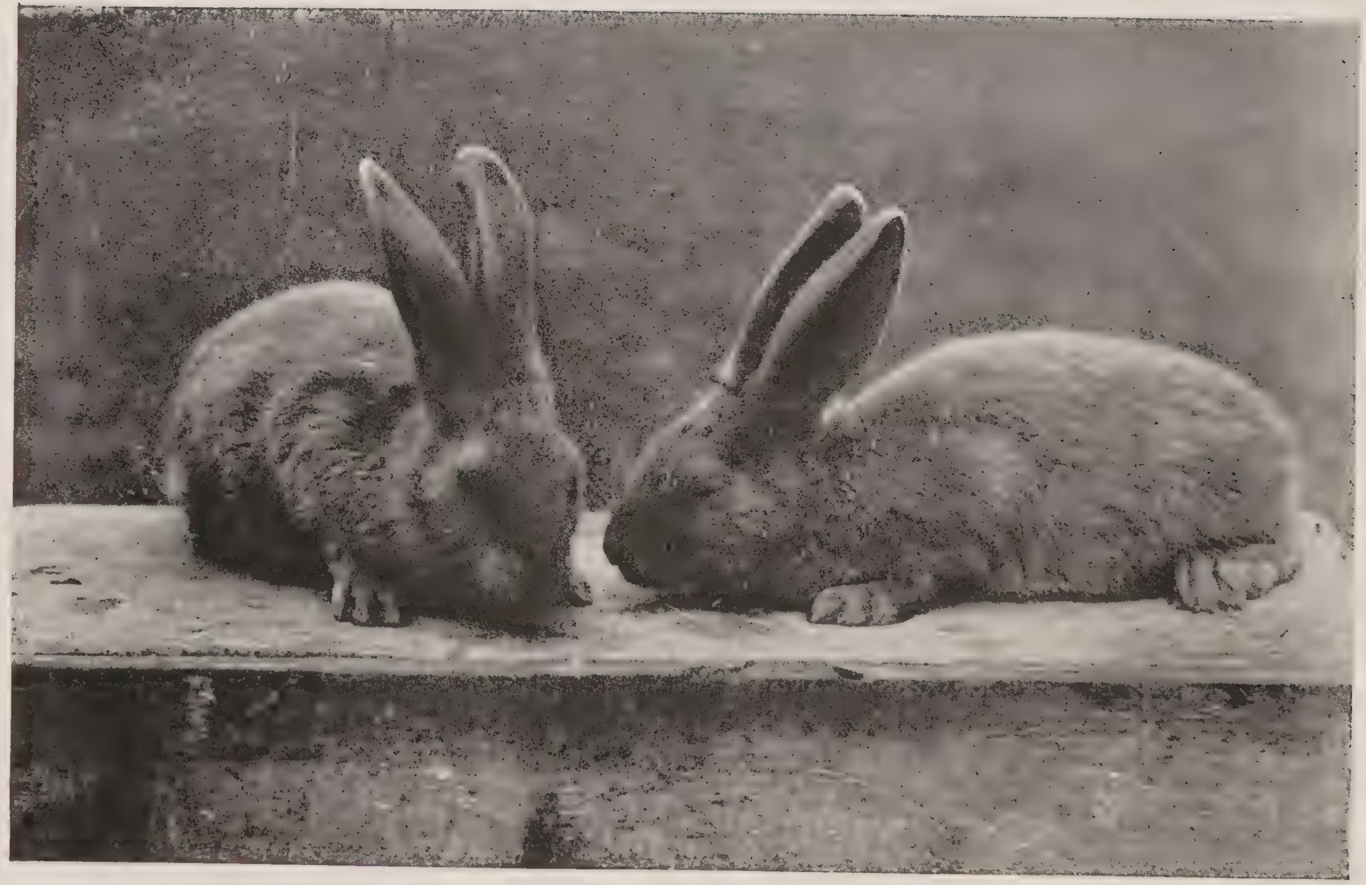
Terrible tales of disaster and loss among rabbits kept on the Morant system have been published in England, but mention is never made of the actual cause of the mortality as revealed by post mortem examinations. Until further evidence is advanced, it seems fairer to blame the owner rather than the system. When one considers the great ignorance displayed by many who keep rabbits, the huge mortality which frequently occurs in ordinary hutches owing to mismanagement, and the totally incorrect feeding which is commonly practised, the wonder often is not that they die, but that any rabbits survive at all in any type of hutch.

METHODS OF MANAGEMENT

On very dry, well-drained, and sheltered land in a mild locality, rabbits can remain out on the grass all the year round, provided shutters are used at night in winter. Shutters will also be necessary at night all the year round in the breeding-hutches from a week or two before the birth of a litter until the young are over the very timid stage of their existence, and are, say, 5 or 6 weeks old.



MORANT HUTCHES.



YOUNG BLUE BEVERENS.

A shelf should always be placed in hutches which stand on the grass for the animals to lie on off the damp ground.

The hutches must not be passed over the same piece of grazing-ground more than twice in the same year, and once is better.

If the hutches are moved from north to south during the early part of the year, they should be moved from east to west the second time they pass over the same ground so as to get the manure fairly evenly distributed. If the area of land available is limited, the hutches should be moved for cleaning purposes only once every twenty-four hours, cut grass or greenstuff being fed in the racks at night. It is very seldom that supplementary greenstuff is not required for some of the rabbits, such as at midday for does with litters, during droughts, etc. The hutches should not usually stand on the same place for more than twenty-four hours, or patches will most likely be burnt in the grass.

Concentrated food should be given every morning at the time the daily moving of the hutches takes place, so that the animals can fill themselves with it rather than with possibly dewy grass. A lump of rock salt should be kept in every food trough.

Rabbits require water to drink no less than when they are in ordinary hutches, and consume a great deal, especially in hot weather.

The hutches should never be moved on to frosty grass.

The present writer has adopted the system of keeping a few guinea pigs to run with young rabbits. They help to eat the grass down closely and pay for themselves.

Ailing or unthrifty rabbits should be removed at once to a wooden-bottomed hutch from which the cleanings can be collected and burnt. To allow the sickly animals to remain on the grass is possibly to sow the seeds of some serious epidemic complaint which may eventually devastate the whole rabbitry.

If it has been heavily stocked during the summer, the grass land should, as a precautionary measure, be limed (say 2 or 3 tons to the acre) every winter, or dressed with 42% basic slag at the rate of 5 to 10 cwt. to the acre. If there has actually been an outbreak of parasitical disease, it will be necessary to dress with salt at the rate of 8 to 10 cwt. to the acre.

Nothing is more cleansing to land which has been heavily stocked than to take a hay crop from it.

Breeders usually desire to keep some other animals on the land partly occupied by rabbits in Morant hutches. Fowls are not recommended, unless they are kept on the colony system far away from the area being grazed by the rabbits. Fowls running about loose among the hutches will probably do more harm by soiling the grass which the rabbits have to eat, than good by scratching the manure about. Both species are subject to the same deadly liver disease (Coccodiosis), and although there is no direct evidence as yet that this disease can actually be transferred from fowl to rabbit, or *vice versa*, it is by no means unlikely, and it is hardly wise in the present state of our knowledge to risk the occurrence. If fowls must be kept in conjunction with rabbits, the best system would be to keep them in movable pens to follow closely on the hutches.

Cattle, pigs, and horses are undesirable among hutches, and will damage them by rubbing against them, if they do not actually knock them over.

The sheep is the animal least likely to do direct damage, and the present writer has kept them among hutches without any serious troubles arising. At the same time clean ground is best for the rabbits, which, owing to their confinement, are unable to pass over dirty places and feed elsewhere. Tethered goats are not likely to appreciate the rich herbage which grows behind the hutches.

A French breeder who worked on a large scale with 150 Morant hutches states that it took two people about forty minutes to move this number, and that it took an hour and a half to distribute food and water to the 800 to 1,000 inmates. Actually four hours of a gardener's time were spent daily in attending to the animals. Five acres of land is the minimum necessary for carrying this number of hutches, and more land is desirable ; five acres does not admit of a daily moving if the same ground is covered not more than twice in the same year, and it means that the rabbits must be mainly rack and trough fed. An English author estimates that one acre will carry five does and progeny.

A trolley, drawn by a donkey or pony, is used to convey the food, water, and other necessities along the lines of hutches.

With the exception of the points briefly indicated, the management of rabbits on the Morant system is the same as their management when kept in the ordinary way as detailed elsewhere in this book.

Breeds for the System

The present writer has kept most breeds, including Angoras, in Morant hutches in the South, has kept them out in the hutches at every time of year without special precautions, and has found that they all do well. The chief, indeed the only serious trouble, is that the light fades the coats of all breeds more or less; but the same can be said of any hutches which stand out of doors, and in the case of the fur breeds the light is not strong enough to do very much harm to the new winter coats, which are not completely through until the middle of November.

Very timid individuals of any breed, or timid breeds like Silver Greys, owing to the ease with which they are upset and frightened, succeed less well in hutches on the grass than the bolder or more phlegmatic races unless special precautions to preserve them from disturbance are taken.

CHAPTER VIII

GENERAL MANAGEMENT

Rabbits require attention twice daily, their natural feeding times being chiefly at periods soon after sunrise and before sunset.

Cleaning Out

Although it is customary in the fancy to recommend that rabbit hutches be cleaned out only twice or maybe once a week, this insanitary system will soon lead to ill-health and outbreaks of disease if persisted in with properly fed utility rabbits kept in large numbers. When rabbits are underfed and on a very dry dietary, the hutches become less dirty than they otherwise do ; this dry feeding, however, does not grow rabbits well, and it is furthermore comparatively expensive to convert greenstuff into dry material when it can be used as it grows with greater benefit to the animals. A certain amount of dry feeding is inevitable in the case of town dwellers ; but they will find that the best and most economical principle in every respect is to use as much mixed greenstuff (such as fresh grass) in the summer as they can get in place of hay.

It is obvious that rabbits cannot for long remain healthy and in a high state of vitality if they have to live with their noses within a foot or two of their accumulating excrements. If a high standard of health is to be maintained, the hutches must, like stables or cowsheds, be cleaned out daily, a little shovelful of fresh sawdust being thrown into the used corners. It is the knowledge of the necessity for a high state of cleanliness, and the labour this entails, which has led some of the most advanced French rabbit breeders to adopt the Morant system when working on a large scale. The present writer can fully endorse their view of the great saving of time and labour which results from moving the hutches from the manure in place of the alternative process.

ABSORBENTS AND BEDDING

Rabbits do not require litter or bedding in their hutches. An absorbent only is necessary in the used corners of solid floored hutches. Some writers recommend straw either long or chaffed; but straw is mainly silica, and hardly at all absorbent, and is quite worthless for the purpose and uncomfortable for the rabbits. These animals always lie by preference on a bare smooth surface. Therefore it is no hardship to them to have a bare floor which is kept clean and dry.

The best and cheapest absorbent is "pine" or deal sawdust, which is procurable from most carpenters, builders, and sawmills. This sawdust is full of turpentine, and is for this reason better, and it is also of a drier nature than the dusts of English deciduous trees such as elm, ash, oak, etc., which are often sawn up in an unseasoned state. Failing sawdust, peat moss dust, or granulated peat moss is suitable, but comes comparatively expensive in most districts. Dry inland sand is excellent for those who are in a position to procure it cheaply, while sifted cinders or ashes can also be used with advantage; the chief thing is to use whatever is cheapest in the breeder's locality, and to use it freely to prevent rotting the wood of the floor. It must be remembered that sand and ashes are apt to encourage fleas if the corners are not well scraped out periodically.

On one day weekly a little powder disinfectant should be thrown into the hutch corners beneath the clean absorbent.

In cold winter weather every rabbit should be furnished with a nest box or compartment filled with straw in which it can lie if it wishes to.

The straws available will probably be oat or wheat. As the stuff will be bitten up and partially eaten by the rabbits, a good quality, clean and fresh, should be used, and not straw which comes out of a packing-case.

Oat straw has quite a good feeding value, but it is less likely to be available than wheat straw.

Neither barley nor bearded wheat straws should be used, because the awns may get into the rabbit's eyes if nothing worse occurs.

Bracken is not a very desirable bedding, as it is suspected of poisonous properties under certain conditions, and is in any case not a wholesome food.

RABBIT MANURE

The present writer has made several attempts to arrive at the average amount of manure produced per head during the twenty-four hours. The crude methods employed, combined with differences in the age and size of the rabbits of various breeds, have added to the difficulties of procuring accurate data; but the conclusion arrived at is that on an average about 8 ozs. to 9 ozs. of solid and liquid matter may be expected daily from well-fed adult animals of medium-sized breeds.

Hutch cleanings are an excellent manure if mixed with peat, sand, or ashes ; but deal sawdust takes years to rot, and also encourages the growth of certain fungi on the land.

When mixed with anything but sawdust, the fresh manure can be dug straight into the ground if desired. An accumulating manure heap is the favourite breeding-place of flies, and myriads will soon be swarming in dwelling-house and rabbitry if precautions are not taken to abate the nuisance. Therefore accumulating heaps should be treated all through the summer and autumn with borax at the rate of 1 oz. per cubic foot, sprinkled on the manure, and especially round the edges of the heap with an ordinary flour dredger, and then a quart of water poured on from a can with a sprinkler. This will prevent flies multiplying, and will not cause any depreciation in the value of the manure. If sawdust heaps are not treated in this way, they must be set alight at least once a week and turned into potash.

In a big rabbitry it will be possible to keep a heap almost continuously burning. To start a fire, choose fairly dry weather, and make a basis of twigs and paper. Place thereon a few shovelsful of the sawdust cleanings from the big heap. When this is well alight, feed it twice daily from the big heap, and it will probably go on smouldering for weeks unless an unusually heavy downpour of rain puts it out, in which case it will be necessary to make a fresh start. The slower it burns the better is the result in potash obtained.

When hutch cleanings are to be used in the garden in their more or less natural state, it is highly important that they be not utilised to manure crops intended for rabbit feeding. This warning is necessary, because many of the old books recommend that the chicory bed, etc., be dressed with rabbit manure. This procedure has no doubt often been the fruitful source of apparently mysterious outbreaks of liver disease or some other devastating complaint throughout a rabbitry. If there is a diseased specimen among the inmates, and its manure is spread on the land from which the food of the animals is obtained, sooner or later the germs of the disease will probably be splashed up on to the undersurfaces of the growing leaves in wet weather with the soil, and in this way they will be eventually conveyed to the healthy members of the rabbitry.

METHODS OF FEEDING

The staple diet is fresh grass in summer, dried grass (hay) in winter, of which there should always be a liberal supply in racks in the hutches for rabbits of every age to pull at as they like. About 12 ozs. of grass is the equivalent of 3 ozs. of hay, and beyond the fact that grass is more easily digested fresh than dried, the action is much the same. The present writer has never known the slightest looseness of the bowels to arise through the most liberal grass feeding, wet or dry just as it comes, whereas this disorder is frequent and usually follows the giving of any considerable amount of one kind of plant. By the term " grass " when used throughout this book is meant the mixed herbage comprising from ten to forty different species of plants which grow on a lawn or in a field, and which, when allowed to run up to flower, are cut and dried and converted into hay.

The concentrated food should be given once daily, it being of no particular importance as a rule whether it is given in the morning or the evening. In the case of rabbits kept in movable hutches on the grass, it is, however, best to give it in the morning before the hutches are moved. Roots or greenstuff should be given at each meal, the latter, in the shape of garden refuse or forage crops, taking the place of roots in summer. By putting down the various components of the ration at the same time, variety, which is so necessary to successful feeding, is secured.

It is probable that the evil reputation earned by wet greenstuff is mainly due to the fact that it is possible to convey the germs of parasites to the hutches with it when it is in this state. The present writer has failed to find that in the wettest summer it causes the slightest intestinal derangement if sound and clean and off clean land. Care is, however, always taken to give a mixture of plants.

Greenstuff is unwholesome if it has been allowed to heat, and for this reason it should never be kept in heaps, but should be laid out loosely on wire-netting racks or on a cool stone floor until required for use.

When a great quantity of one kind of plant is available on a certain day, when, say, one of the root crops is being got in and there is an abundance of " tops," or when the gardener is clearing a piece of ground for a new crop, the rabbit-keeper is in danger of causing illness among his stock by feeding too heavily upon one kind of plant. It is rarely worth while trying to dry and reserve the surplus for winter use, but its freshness can be preserved, and its use can be extended over many days, by putting the stalks in a vessel of water which stands in a cool, shady place.

The drying of mature " grass," or green forage crops into hay, or of pea haulm, are practicable propositions ; but there is very little else that can be satisfactorily preserved for winter use. Ensilage has been suggested for rabbits, but, apart from the fact that it is not suited to any animals but ruminants, it can only be made on a comparatively large scale. For instance, from 35 to 50 lbs. of greenstuff, when compressed with the 100 lbs. pressure required, will ultimately form a small block of a cubic foot in size, most of which will be outside and unfit for use ; more than a ton of green material will be required to make a block of silage 3 feet by 3 feet by 5 feet high.

When hay is made, the grass, clover, or whatever is to be used should be cut when the majority of the plants are in flower. In the South of England, hay with the best feeding value is made from meadow grass cut about June 14th.

Frosted greenstuff must never be given to rabbits, and roots which have become frozen must be thawed in front of a fire and used up quickly, as they do not keep afterwards for long. In severe weather it is best to keep such roots as are required for immediate use in a warm room. If at feeding time 10° or more of frost prevails, small pieces which will be eaten up at once by the rabbits in a few minutes are the most that should be given. When a lot of trouble has been taken to thaw the roots, serious illness has often followed after all because the owner has given more than the rabbits can eat up at once, the fragments have frozen in the hutches, and the animals have eaten them in this state later on. As there is nothing more deadly than frozen roots, too much emphasis cannot be laid on the matter. It is obvious that whenever possible the roots should be stored where they are safe from frost, or should be so well covered with straw and earth that they are completely protected.

Grass and greenstuff gathered for rabbits should always be chosen from open, sunny spots. Coarse, long, lush grass grown in the shade or in damp situations should never be given, as this is the type which will often be the cause of an outbreak of parasitical disease.

No mildewed, mouldy, diseased, or in any way unsound vegetable matter should be given to rabbits.

The stumps of plants of the cabbage tribe are more appreciated than the young shoots, and should always be split up for the animals to scoop out.

The flowering shoots of kales, etc., should be given in moderate quantities, as they are acrid and cause great thirst.

Very few greenstuffs are injurious in moderate quantities when well mixed with other plants, but a great number are endowed with medicinal properties, which manifest themselves by causing indisposition or serious illness if such quantities of the plant are eaten as will constitute a " dose " of the active principle.

Therefore it is wrong in theory and practice to go out and gather a basketful of one sort of plant for rabbits. No bad results will follow if each animal receives a small portion in addition to hay and other food ; but if the gatherer had brought home a variety of food, each animal could have received a far larger portion, and it would have taken the place and saved the use of some of the hay.

All changes of food, whether of greenstuffs or other foods, should be made gradually, the complete change from, say, greenstuff to roots, taking at least a week while one sort of food is substituted for another.

POISONOUS PLANTS

Most vegetable poisoning manifests itself in a more or less similar manner.

The usual symptoms are : first, violent colic ; followed by nervous trouble, such as marked excitability or extreme drowsiness; terminating in paralysis of the hindquarters and death. The preliminary colic may be of short duration, or may occur in the night, and is very likely to escape the notice of the rabbit owner. Furthermore, the precise course taken depends greatly upon the nature of the substance and the dose received. If taken in very small quantities regularly over a period of time animals often become insensible to the action of some poisons which would be fatal in large and sudden doses.

Other poisons, the solanin of potatoes for instance, are what is called cumulative (eliminated very slowly), and the symptoms are not marked until the animal has been receiving the poisonous plant for a considerable time.

Acute poisoning with intense symptoms and death in a few minutes or hours may follow a large dose of some substance which would merely cause temporary indisposition in a small amount; or it may result from comparatively small portions of certain plants, such as Hemlock, given accidentally.

It is never safe to trust to the instinct of hutch-bred rabbits in the matter of green food, for, although animals which are thoroughly healthy and well-fed usually avoid deleterious plants if a choice is available, a proportion will fail to do so, especially in the spring after months of deprivation, and it is therefore important that the owner should avoid putting anything into the hutches which is at all of a doubtful character.

The following common poisonous plants are among those which are most likely to be used by rabbit breeders:

Virulent Poisons

Meadow Saffron or Autumn Crocus (*Colchicum autumnale*). Found among the herbage of meadows. Throws up a purple crocus-like flower in the autumn. All parts poisonous fresh or dried.

Hemlock (*Conium maculatum*). Often mistaken for Wild Parsley, as it grows in similar situations especially in the north of England. Hemlock has a round, purple-spotted stem, and emits a fetid (mousey) odour when bruised.

Henbane (*Hyoscyanine niger*). Grows on rubbish heaps. About 1 foot high. Stems and leaves have a fetid odour.

Foxglove (*Digitalis purpurea*). Tall, with purple tubular flowers. Grows chiefly in woods.

Deadly Nightshade (*Atropa belladonna*). Grows in hedgerows. Has dark purple flowers in June and purple berries in August.

Water Dropwort (*Eonanthe crocata*). Not unlike wild celery. Grows on river banks. Common.

Woody Nightshade or Bittersweet (*Solanum dulcamara*). Climbs in hedgerows. Has purple flowers and scarlet berries.

Common Bryony (*Bryonia dioica*). A vine-like plant growing in woods and hedges. Small greenish flowers and scarlet berries.

Black Bryony (*Tamus communis*). Another climbing plant found in woods with heart-shaped leaves and scarlet berries.

Potato haulm and potatoes under certain conditions.

Poisonous in large quantities, or if too persistently fed:

Wild Chervil, Beaked Parsley, Sheep's or Asses' Parsley (*Chœrophyllum* or *Anthriscus sylvestris*). Grows in very similar situations to Hedge Parsley (*Torilis*) and in hayfields.

Buttercup (*Ranunculus*). Not poisonous when dried in hay.

Wild or cultivated Mustard (*Brassica*); Wild Radish (*Raphanus*); Wild Carrot (*Daucus*); Wild or cultivated Lettuce (*Lactuca*).

Rhubarb (*Rheum*).

Bindweed (*Convolvulus*).

Lupine (*Lupinus*).

Dock or Sorrel (*Rumex*).

Potato (*Solanum tuberosum*), raw, especially the raw peel and tubers which are diseased or have "greened" or are shooting. Potatoes should always be boiled before use and the water thrown away, as this contains most of the poison.

Buckwheat (*Polygonum*) when in flower.

Horsetail (*Equisetum*).

Bracken (*Pteris aquilina*).

French Beans (*Phaseolus*).

Corn Cockle (*Agrostemma Githage*).

Tansy (*Tanacetum vulgare*).

Onion (*Allium*).

Acorns when unripe. Oak leaves, and hawthorn leaves, fruit, and twigs; buckthorn twigs.

Most of, if not all the above can be given occasionally in small quantities, well mixed with other food or under the special conditions specified, but must not be fed lavishly or frequently.

Foodstuffs to avoid :

Foreign beans and peas, such as Java beans, unless guaranteed innocuous.

All mouldy substances, such as mouldy bread, meals, cattle cakes, etc., which are apt to be very poisonous when in this condition.

Sour brewers' grains.

The leaves of all evergreen trees and shrubs, and also the leaves and other parts of all ornamental deciduous garden trees, such as laburnum, etc.

Also all ornamental garden plants, including bulbs, many of which are of foreign origin and belong to highly poisonous tribes.

WATER

Rabbits require water to drink, and a supply, renewed daily, should be kept in every hutch. It is not correct to assume that rabbits fed mainly on green food always obtain sufficient water in the plants consumed. Many greenstuffs actually create thirst, and in very hot weather rabbits receiving a dietary composed exclusively of green food, together with a little damp concentrated food in the morning, will often drink as much as a half-pint of water in 24 hours. Young rabbits cannot make the best growth of which they are capable if deprived of drinking water, some 50% of the new tissues being formed of water, and in animals of all ages it performs many valuable functions which contribute to their health and well-being.

It has been estimated in France that sheep require from 1 to 3 parts of water for 1 part of dry matter consumed. As it is impossible in practice, however, to give sheep or rabbits precisely the amount they require at the moment they desire it (both circumstances varying from day to day according to the weather, nature of the dietary, etc.), the only commonsense method is to place water within reach to enable the animals to satisfy their needs. There would be a much-reduced mortality in rabbitries from digestive troubles if the practice of giving water to drink was universal instead of exceptional.

SALT

All animals require salt, and rabbits are no exception. In addition to the physiological functions it performs, salt helps to keep the intestines free of parasites, and for this reason, if for no other, it should always be given. As it is not easy to insure that each individual gets its due share when a correct proportion of salt is added to a bucketful of concentrated food, the best plan is to keep a lump of rock salt in every trough or hayrack for the animals to lick. As more salt is required in wet weather than in dry, the lump in the trough acts automatically by becoming damp and making the food more saline at the times when it is most required. The present writer has adopted this system for many years, and has never known rabbits to suffer from an excess. On the other hand, it is a well-known fact, proved by experiments with cattle, that the entire deprivation of salt leads to serious ill-health in the course of from three to fifteen months, and recovery only follows when salt is once more added to the dietary.

LIME

All growing animals require lime for the formation of their bones. An insufficiency is shown in deformed forelimbs (rickets), which are often actually bent. A small rabbit can usually obtain sufficient lime for its requirements from the ordinary food. This is not always the case, however, with the very large, quick-growing, and heavy breeds, and especially with Lops, which have an abnormal weight of ear to support on the forelegs as well as a big head and body. If a lump of chalk is put in each hutch, the young rabbits will lick it and take as much as they require; or powdered chalk can be added to the concentrated food at the rate of, say, 1 to 2 ozs. to 14 lbs. of concentrated food. It has been shown by experiments in France that rabbits fed only on oats died, while those which received chalk in addition to the oats developed normally.

Lime can be given in the form of phosphates. Bone meal furnishes it, but the quantity suggested for chalk must be doubled if it is given in the form of bone. A good fish meal usually has about 18% of phosphates, and when used as part of the concentrated food, supplies all that rabbits require.

Breeders who rear their rabbits on the Morant system will find it desirable to dress the land periodically with basic slag, which will furnish phosphates and lime and aid the production of well-formed stock.

The natural substances which contain the most lime are milk and young herbage ; the foods which contain least are cereals, cakes, roots, and tubers, a diet, for instance, of straw and certain concentrated foods being one which would necessitate the addition of lime in some form.

HANDLING RABBITS

The barbarous method of lifting a rabbit by its ears, in common practice among fanciers who fear to spoil the coat of an exhibition specimen by inadvertently pulling out a tuft of hair, is not to be recommended. Rabbits have plenty of loose skin just behind the shoulder-blades by which they can be lifted without discomfort or necessary injury to the coat. A second hand beneath the rump of a very heavy animal is desirable. This method of lifting by the skin of the back is the only one by which savage animals can be safely handled. In the case of very difficult individuals, if the ears are held down by the same hand which is grasping the skin, increased control is obtained. Rabbits do not usually object to being lifted in the way recommended. The youngster depicted (see illustration facing page 96) did not move or struggle although lifted again and again into position before the photograph was taken. On the other hand, a rabbit lifted by the ears can kick and tear a man's arm open with its hind claws if bent on vigorous protest. Handling by the ears often seems to lead to them becoming bare of fur.

A good deal of trouble in later life is avoided if young rabbits are regularly handled when they first leave the nest. If they are allowed to grow up untouched, specimens of some breeds are very likely to kick and bite when mature. Rabbits at their best are awkward, and at their worst dangerous creatures to handle, so that it is important for the breeder to endeavour to obtain skill in those methods of handling which give least discomfort to both parties concerned.

CHAPTER IX

PRINCIPLES OF FEEDING

NOTHING is of greater importance than the subject of feeding, which may be said to be the keynote to successful rabbit management. It is no good learning to breed rabbits if they fail to grow, or maybe die before they reach maturity ; nor can success in breeding be attained unless a knowledge of the correct method of feeding adult stock be acquired.

Thousands of rabbits die annually from nothing more serious than digestive troubles due to incorrect feeding, and it is therefore of the highest importance that all those who value the welfare of their stock and the success of their enterprise should learn the theory and practice of correct feeding, which applies no less to rabbits than it does to all classes of farm animals and to man himself. An endeavour will be made to set forth as briefly as possible the essential points it is necessary to know in order to feed successfully, while avoiding as far as is consistent with lucidity the technicalities and more scientific aspects of the subject which are of greater interest to the student than the practical breeder of rabbits.

THEORY OF FEEDING

No substance is of any use as food to an animal unless it can digest from it certain quantities of albuminoids, fats, and carbohydrates, which are called the *nutritive principles* of the food.

Every common foodstuff has been analysed, and the average proportions of these three principal ingredients ascertained and set out in tables, which are to be found in most text-books on feeding.

A *ration* is the food required and consumed by an animal in twenty-four hours, and a correctly compounded or *properly balanced ration* is made by combining a variety of foodstuffs of known composition in definite proportions so that the animal which eats them receives the necessary quantities of digestible albuminoids, fats, and carbohydrates essential to its needs.

ALBUMINOIDS

As already hinted in the chapter on Growth, it is the albuminoids or nitrogenous substances in a food which promote growth ; from them the flesh (muscle), ligaments, tendons, skin, hair, and nails are formed, also the milk of females rearing litters, and no other nutritive substances have this power or can replace them.

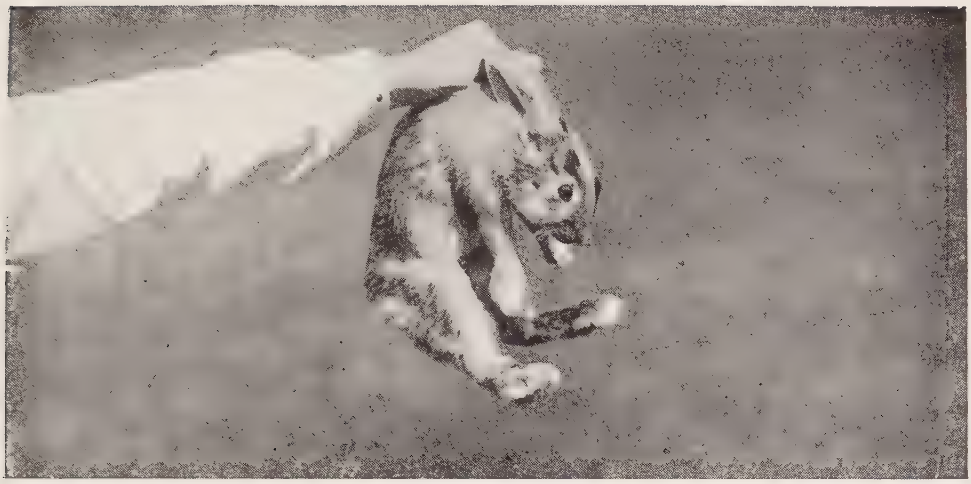
If young growing animals receive a dietary which contains an amount of albuminoids which is insufficient to their needs, they fail to grow as rapidly as they would if correctly fed, and they keep very thin during the period of greatest growth. If a nursing mother is not receiving a ration which enables her to form as much milk as she is hereditarily capable of, or as her offspring require, she draws on the surplus albuminoids already stored up in her own body to supply the deficiencies, and consequently " falls off in condition."

It is obvious, therefore, that albuminoids are of great importance in the dietary of animals from their birth until the termination of their period of growth.

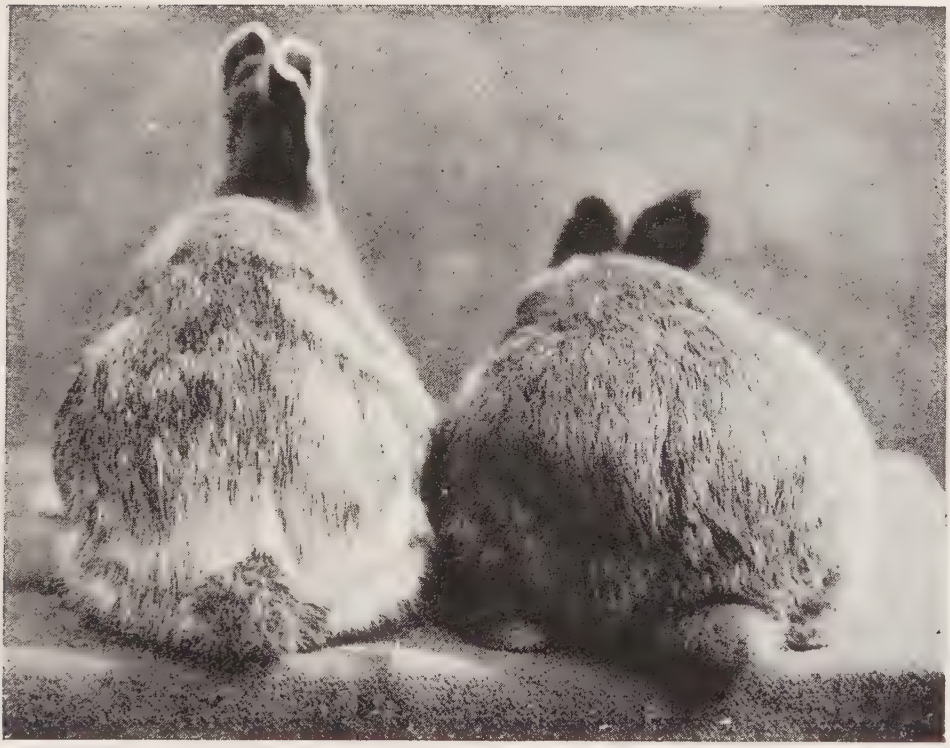
In idle adult animals, on the other hand, in which the body is already formed and has merely to be maintained at its normal weight (repair of waste), a very much smaller proportion of albuminoids is required. When animals are fed in excess of their requirements, some of the excess is utilised in the formation of fat and flesh ; hence the fact that young rabbits only begin to fatten easily and on a moderate amount of food when rapid growth ceases. A still further excess beyond all possible needs is simply excreted in the form of urea through the kidneys, and is for all practical purposes (other than the enrichment of the manure heap) wasted.

CARBOHYDRATES

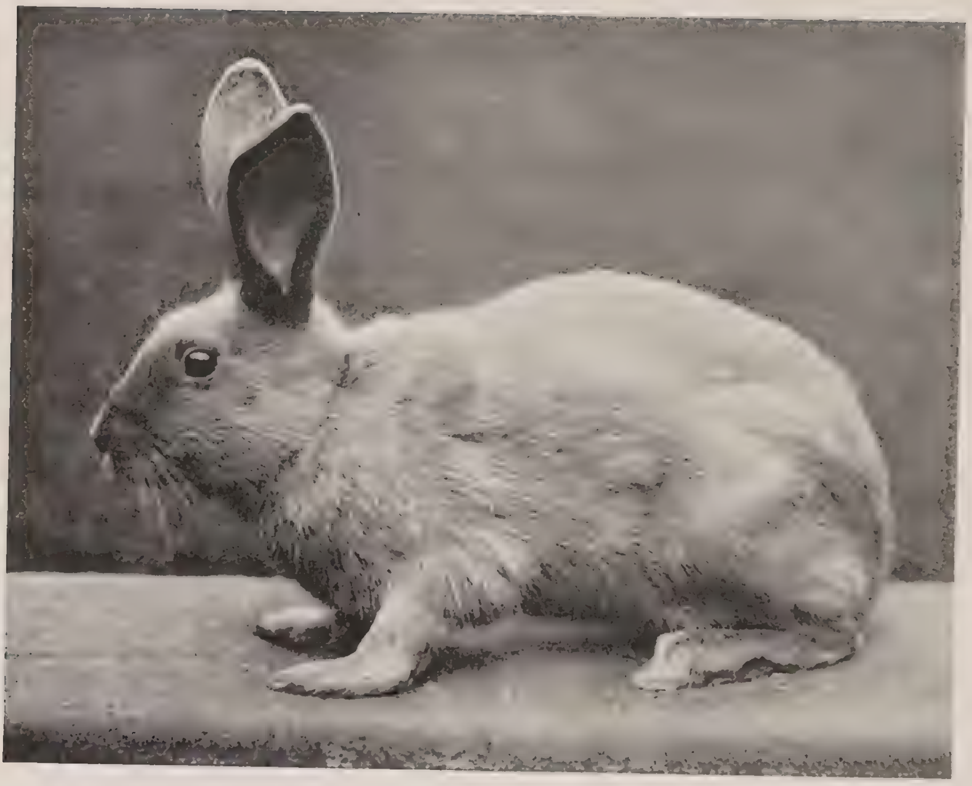
The carbohydrates of a food supply heat, energy, and, when fed in excess of the requirements in these two respects, they form fat.



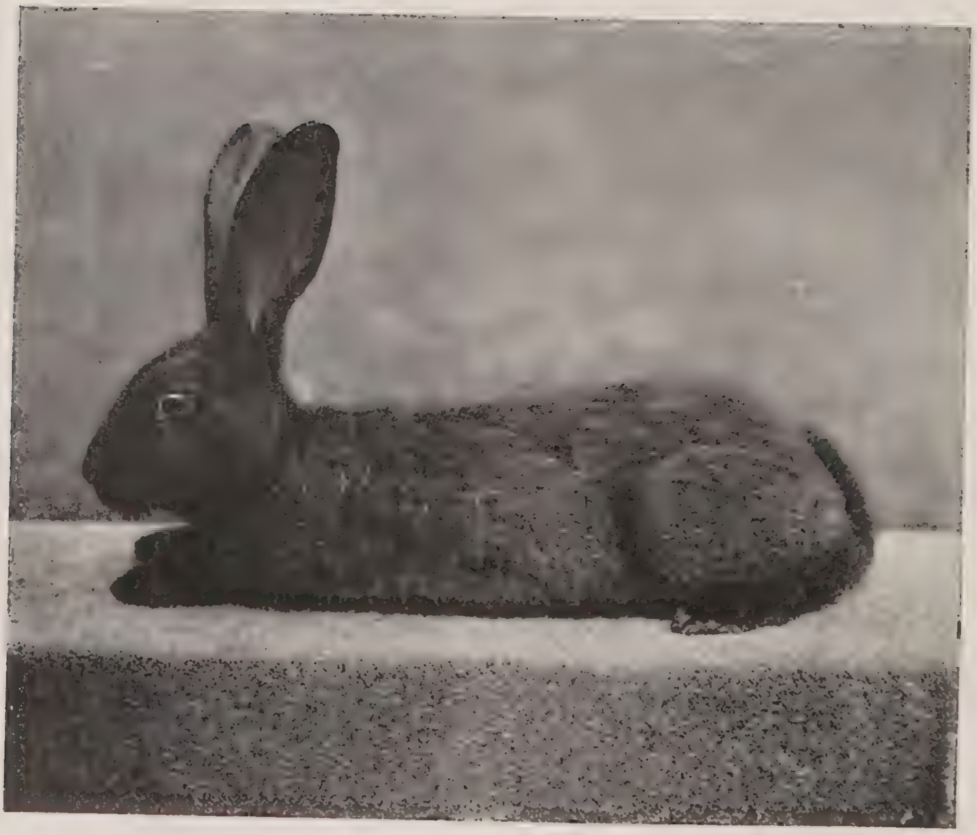
HOW TO LIFT A RABBIT.



A GOOD AND A BAD BACK.



" LILAC " DOE.



YOUNG BLACK FLEMISH GIANT DOE.

The dietary suited to working animals or individuals which are being fattened is therefore one with a low percentage of albuminoids and a high percentage of carbohydrates. Although carbohydrates alone cannot form the tissues which are, as already explained, almost exclusively derived from albuminoids, the reverse is not the case. Albuminoids can supply heat and energy and fat when the carbohydrates are not present in sufficient quantities to do so; but as albuminoid substances are much more expensive to buy than carbohydrates, and form the most costly and difficult part of the dietary to supply, the practical feeder limits their use to the lowest amount possible, and obtains the necessary results by their use in definite proportions in conjunction with carbohydrates derived from substances which are cheap and easily obtained. It can generally be taken for granted that ordinary foods (hay, roots, etc.) supply all the carbohydrates required in a ration.

FATS

The fats in a food also supply heat, energy, and fat to the animal body; but as a given weight of fat produces approximately two and a half times more heat and energy than an equal weight of carbohydrates, it is customary, when compounding a ration, to multiply the proportion of fats by two and a half times, adding the total to the carbohydrates.

ALBUMINOID RATIO

Experiments in feeding have shown that (1) animals require an approximately definite amount of food per pound liveweight, and (2) that in this food, to get the best and most economical results, the relation of carbohydrates to albuminoids must bear a fairly definite proportion or ratio to one another. This proportion is called the *albuminoid ratio*, and it is usually expressed by stating the number of parts by weight of carbohydrates the ration should contain in proportion to one part of albuminoid.

A ratio in which the proportion of carbohydrates to one part of albuminoids is small is called a narrow or close ratio; while when the proportion of carbohydrates is large, it is called a wide ratio.

As already stated, young growing animals and mothers require a narrow ratio ; idle adults a wide.

In most classes of farm livestock the correct ratio for youngsters is 4 parts of carbohydrates to 1 of albuminoids (1 to 4). A French breeder of rabbits who worked on a large scale gave a ration with an albuminoid ratio of 1 to 5 for youngsters, 1 to 3½ for breeding does.

Personal experiments have shown the present writer that a wide ratio is not suitable for rabbits, and there are indications which suggest that an exceedingly narrow one may not be undesirable. French authors state that the milk of "rapidly growing small mammals" (? rabbit) has an albuminoid ratio of 1 to 2 ; and if this is the case, it helps to explain the reason why a ratio of 1 to 3 or even narrower has proved most successful in the present writer's experience with young rabbits. The ratio of average cow's milk, it may be added, is 1 to 4.

It may be asked, whether, by giving a young animal a ration which is richer in albuminoids than the natural amount required, a more rapid growth can be obtained? The answer is in the negative. Experiments have proved that although by deprivation of the necessary proportion of albuminoids growth is retarded, to give an excess does not have an opposite effect and stimulate growth beyond a definite maximum limit. Indeed one may go further and state that the excess frequently leads to such digestive disturbances that the ultimate result is unsatisfactory. The approximately correct proportion is the object to aim at, and this for growing rabbits and suckling does must not be wider than 1 to 4, and possibly less.

Full-grown idle animals require food in which the nutritive principles bear the proportion of 1 to 8 or maybe narrower. But it must be remembered that adult rabbits are, or should be, seldom "idle" ; that they are always either breeding, moulting, or improving in condition, therefore they almost always require a ration of 1 to 4 or 1 to 6.

Calculating the Albuminoid Ratio

If it is desired to calculate the albuminoid ratio of hay or some other feeding-stuff, a table of analyses of foodstuffs is consulted. In this it is found that average meadow hay contains about 5% of digestible albuminoids, 41% of carbohydrates, and 1% of fats. Leaving out decimals (as will be done throughout this book, for no two samples of a similar substance are likely to analyse to fractionally similar figures), the 1% of fats is multiplied by 2½ and added to the carbohydrates, giving a total of 43½. This is divided by 5 (the albuminoids), giving an albuminoid ratio of 1 to 8 or 9, proving that provided it can eat enough of it, average hay contains sufficient nutriment to support an adult idle animal.

The albuminoid ratio of a mixture of foods is obtained in the same way. The albuminoids, fats, and carbohydrates of each ingredient are multiplied by the number of parts of each given, the whole added up, and the total divided thus:

	Alb.	Fat.		Carbo.
3 ozs. hay =	15	3		123
8 ozs. swedes =	8	0		80
4 ozs. oats =	36	16		192
	59	19 × 2½	=	47½

59)442½(7½
413

29½

or a ratio of 1 to 7½ nearly.

We now come to another point:

THE AMOUNT OF FOOD REQUIRED

According to the result of the present writer's investigations, adult rabbits require an amount of food every twenty-four hours which works out, on an average, to about 2 ozs. per pound liveweight of the animal. According to a French computation, a suckling doe requires rather more than ½ oz. of dry matter per pound liveweight, and youngsters on an average half this amount. The proportion of dry matter is ascertained by deducting the percentage of water as given in a table of food analyses. Thus a 9-lb. to 10-lb. breeding doe requires, according to this French breeder, about 5 ozs. dry matter daily containing about ¾ oz. albuminoids, less than 1 oz. fat, and nearly 2 ozs. carbohydrates. In the present writer's experience a 6-lb. rabbit requires 12 ozs. food, a 9-lb. rabbit rather more than 1 lb. of a properly balanced ration per day. But it is obvious that the whole success of feeding on this basis depends entirely upon the nature of the ration and its precise adaptation to the special needs of the animal. Thus, if an idle adult doe of 6 lbs. will do well on 12 ozs. of food of which the albuminoid ratio is 1 to 6, a nursing doe will only do equally well if the 12 ozs. of food is so selected as to give an albuminoid ratio not wider than 1 to 3 or 4. In other words, the increased needs of the animal are not necessarily met by increasing the *amount* of food given, but rather by enriching its quality. As the youngsters grow, the quantity has also, of course, to be gradually added to.

FIBRE

This brings us to the subject of fibre in food. Crude fibre is the woody and comparatively indigestible portion of foods, a certain proportion of which in the dietary is beneficial and essential to digestion. The various straws contain round about 40% of fibre, average hay some 25%, swedes but little more than 1%.

Now although a certain amount of fibre is necessary to digestion, there is a distinct limit to the quantity upon which an animal can thrive. Not only is there a limit to the food capacity of an animal's stomach to ingest great quantities of coarse and bulky food, but there is also a limit to the amount of energy absorbed by the mastication and digestion of fibre. If a rabbit is fed on a dietary which contains a very great proportion of fibre it will not thrive, because (1) it will be physically unable to eat sufficient of a bulky and indigestible material in twenty-four hours to satisfy its needs, and (2) the energy expended in mastication and digestion of this food will be greater than the amount of nutriment obtained. In other words, the animal fed on a coarse dietary with too great a proportion of fibre will obtain no spare nutriment from it for the nourishing of its own body after providing the necessary energy for digesting the food, hence it will lose condition. Probably about 10% of fibre is the utmost desirable in a ration.

COMPOUNDING A RATION

It will therefore be understood why it is that rabbits will not be likely to thrive upon a dietary which is selected exclusively upon the albuminoid ratio. The albuminoid ratio of good average hay shows that it possesses almost all the nutritive principles necessary to keep an idle adult rabbit in fair condition, and it is possible that a very small rabbit, requiring only 6 or 7 ozs. per day, may be able to thrive upon it. When we come to individuals of 6 lb. weight and upwards requiring 12 ozs. or more of food daily, however, we find that it is practically impossible for the animal to consume ¾ lb. of hay daily, which is the amount required to supply a minimum of nutriment. Hence the necessity arises in selecting a ration of combining several classes of foodstuffs which together give the albuminoid ratio required in a not too bulky and in an easily digested form. As roots contain practically no fibre and hay contains from 21% to 33% according to its quality, the two together in the proportion of about 3 ozs. hay to 8 ozs. swedes or mangolds for a 6-lb. rabbit, or 4½ ozs. hay, 12 ozs. roots for a 9-lb. rabbit, form a very suitable and cheap part of the winter ration, with an albuminoid ratio of about 1 to 9. These quantities will not, however, quite support the animal owing to deficiencies both in quantity and quality.

BALANCING THE RATION

The rabbit requires about 1 oz. to 1½ ozs. more food to satisfy its needs in quantity, and at the same time this additional ounce must contain a high percentage of albuminoids to enable the animal's requirements in quality to be also met. It is therefore best given in the form of concentrated food containing a high percentage of albuminoids. Fish meal of a good quality contains a higher percentage of easily digested albuminoids than almost any other food, and rabbits do very well on it. It is so rich, and required in such small quantities, however, that it cannot be given alone. It is necessary to open it up with a coarse food such as bran or dried grains, and a mixture of 1 part fish meal to 3 parts bran or dried grains (albuminoids 20%) will supply the necessary constituents to balance the ration and make the albuminoid ratio of the total food rather more than 1 to 5.

Another way of dealing with the problem is to reckon that rabbits receiving a dietary of hay and roots require in addition from 1 oz. upwards according to their age, size, and function of concentrated food containing from 15% to 20% of albuminoids, 4 to 6% of oil, and not more than 8% of fibre. Oats have about 9 or 10% of digestible albuminoids; all cereals fall far below the desired standard; therefore it is necessary to compound a food by mixing together two or more ingredients of suitable analysis. Bran or dried grains, with about 10% to 15% of albuminoids, being cheaply and easily obtainable, must generally form the basis of the concentrated food, and to 1 lb. of either may be added:

(1) 1 lb. maize gluten feed (digestible albuminoids of total mixture 15½%).

(2) 1 lb. maize or barley meal, ½ lb. good fish meal (A. 17%).

(3) 1 lb. oatmeal, 2 lbs. crushed dairy cake (A. 16%).

(4) 1 lb. bean or pea meal, 1 lb. linseed cake (ground), 1 lb. maize meal (A. 15½).

Mixtures of foods give better practical results in feeding than single foods, and the above examples are merely selected at random to illustrate the method of compounding the concentrated part of the ration. Further details are given in the following table:

CONCENTRATED FOODS

(*a*) Very rich, with between 30% and 40% of digestible albuminoids and low in fibre:

	Alb. %	Fats. %	Carbo. %	Crude Fibre. %
Decorticated earthnut cake	40	7	25	5
Soya bean cake . .	33	5	28	4
Decorticated cotton cake .	33	8	20	8
Maize gluten meal . .	32	3	42	2
Soya beans . . .	30	16	25	5

(*b*) With between 20% and 25% of digestible albuminoids:

	Alb. %	Fats. %	Carbo. %	Crude Fibre. %
Linseed cake . . .	25	9½	30	9
Vetches	23	1½	50	6
Maize gluten feed . .	21	2½	52	6
Beans	21	1	48	7
Lentils	21	1	51	7
Good compound or dairy cake	20	7	40	11
Linseed	20	35	19	6

(*c*) With between 15% and 20% of digestible albuminoids :

	Alb. %	Fats. %	Carbo. %	Crude Fibre. %
Peas	18	1	53	6
Egyptian cotton cake	18	4½	20	20
Coconut cake	17	8	40	15
Dried brewers' grains	15	6	34	19
Bombay cotton cake	15	4	21	22
Palmnut cake	15	6	40	22

(*d*) With less than 15% of digestible albuminoids, and most suitable alone for fattening rather than breeding and growing stock :

Oatmeal	13	7½	60	3
Malt culms	12	1	40	12½
Sharps (coarse middlings or thirds)	12	3	56	8
Pollards (fine middlings or seconds)	11	2	50	5
Bran (wheat)	10½	1	50	9
Wheat	10½	1	65	2
Rye	10	1	65	2
Oats	9	4	48	10
Maize germ	9	6	55	10
Barley	8	1½	60	5
Dari	8	2½	67	1½
Rice meal	7½	10	47	8
Buckwheat	7½	1	51	15
Maize	7	4	66	2
Locust beans	4	1	65	6

Miscellaneous foods :

Wet brewers' grains	3½	1	10	5
Acorns	2	1½	34	4½
Apples	0	0	11	1½
Horse chestnuts	5	1	34½	3
Molasses	0	0	55	0
Cow's milk	3	3½	5	0
Goat's milk	3½	4	4	0
Oat hulls	1	½	40	28
Dried sugar-beet pulp	4	½	65	19
Flesh or meat meal	67	13	½	0
Fish meal	51	3	0	0
Tree leaves (July)	4	1	24	7
Ditto (withered)	13	5	36	10

The above tables give the *digestible* constituents of each food, as digestibility is the chief point of importance. Under the Fertilisers and Feeding Stuffs Act, every vendor is obliged to give the percentage of albuminoids (but not the percentage of *digestible* albuminoids) of the various foods he sells. Therefore all foods bought will be guaranteed to contain what will in most cases be a much higher percentage than that given in these tables. For instance, malt culms might be sold as containing 23% of albuminoids; but only about 12% of these are digestible. Soya bean cake may have 42% of which only 33% are digestible. In practice it will be found that the foods with this low digestibility must be fed carefully in small quantities well mixed with several other ingredients. By comparing the vendor's guarantee with the above table, the buyer will be able to get a fair idea of the actual feeding value of the stuff he purchases. It should be added that the digestibility of the various foods has been ascertained by experiments on farm animals, and the results do not necessarily apply strictly to rabbits, although it is believed that they do so sufficiently to form a working basis for compounding rations.

Suitable concentrated foods to feed with hay and roots, containing as required by the standard between 15% and 20% of albuminoids, can be made from the foregoing table near enough for all practical purposes by combining 1 part by weight of one or more of the foods in (*a*) with 1 part by weight each of (*c*) and (*d*). Example: 1 lb. Soya bean cake meal, 1 lb. dried grains, 1 lb. sharps. Alb. 20%.

Or another combination is: 1 part (*a*), 2 parts (*d*); average alb. 18%.

Or equal weights of (*b*) and (*d*); average alb. 16%.

Or 1 part (*b*), 1 part (*c*), 2 parts (*d*); average alb. 15%; and so on. The details can be worked out by the feeder so as to combine the most suitable or easily procurable ingredients. For instance, bran and dried grains need not both be included in the same ration, as both are bulky and equally useful for opening up the highly concentrated foods; nor would maize gluten feed and maize meal be used together; nor two foods both of which contain a high percentage of fibre. Two or more foodstuffs in (*d*) can be combined together to give variety to fattening animals; but they are not suitable for giving alone to growing and breeding-stock if the best results are required.

As regards digestibility, it is probable that rabbits will digest about the same proportion of a food as horses. All animals seem to digest much the same amount of concentrated food (from 75% upwards); but horses digest 11% to 12% less of hay and 50% less of straw than ruminants. A certain amount of individual variation in digestive power has also to be taken into consideration by the practical feeder.

CONDIMENTAL FOODS

Fanciers are fond of using penny ¼ lb. packets of condimental or patent foods to mix with meals. They are relished by the rabbits, but as their basis is usually merely maize, locust beans, and linseed cake, together with certain spices, etc., the price paid is out of all proportion to the value of the food. If fanciers realise that when they buy these penny packets they are often paying at the rate of about £37 per ton for stuff with no better feeding value than good linseed cake at £10 per ton, it is probable that they will find they can spend their money to better advantage.

Here is a formula for an ordinary condimental food in common use for stock-feeding among those who like this type of food, the average cost being under 1¾*d.* per lb., or round about 16/– per cwt.:

	lbs.		lbs.
Maize meal	50	Common salt	2
Locust bean meal	20	Gentian	2
Best linseed cake (ground)	14	Aniseed	2
Sulphur	8	Ginger	2
Saltpetre	8		
Fenugreek	4		112

A legitimate use for such a mixture is to add a small portion to make unattractive or inferior foods palatable, or to add it to the usual concentrated food of animals which are out of sorts or low in condition. The stuff must be treated rather as a tonic than as a food, and not more than about ½ oz. per head given daily for a limited time.

Inferior hay or unpalatable foods can also be made eatable by the addition of cane sugar molasses. This should be mixed with an equal weight of warm water and poured over the food; but it should be used very sparingly for breeding-stock, as it is believed to cause sterility. For fattening animals molasses acts as an appetiser, conditioner, and fattener, and one ounce daily among about 5 medium-sized rabbits will be found a fair allowance.

Molasses is also useful as a laxative when roots are unprocurable.

MIXING CONCENTRATED FOODS

It is obvious that a great deal of the success of a concentrated food in practical use depends upon its thorough mixing or blending. Assuming that the concentrated food is to be composed of 2 parts bran, 2 parts maize or barley meal, 1 part fish meal, the best procedure is as follows: Weigh out and place on a clean floor or outspread newspaper 7 lbs. of the cereal meal (or 14 lbs., or 21 lbs., or 56 lbs., or whatever quantity is required). To this add 3½ lbs. of fish meal (or a proportionate amount), and thoroughly blend the two together with the hands until they are evenly mixed. Place the mixture in a bag or bin. The coarse part of the mixture—bran or dried grains—must be kept in a separate bag or bin.

Obtain a small measure, such as a little tin which has held chemist's ointment or powder, of a size which is found when its contents are weighed to hold 1 oz. of bran. The same measure will be found to hold about 2 ozs. of the meal mixture or near enough for practical purposes. With such a measure it is easy to draw sufficient food in ounces for the daily requirements in the proportion of two of coarse to one of meal mixture. This can be put into a bucket and blended at once; or the coarse food can be put in first, damped, and left awhile, and then the correct proportion of meals added to dry it off.

To serve the food to the rabbits, the use of a second measure rather smaller than the first, which holds 1 oz. of the complete mixture, insures that each rabbit will receive approximately the number of ounces it is entitled to at the moment. Meal mixtures should always be given damp, as they are apt to induce sneezing if served in a dry state.

DIGESTIBLE CONSTITUENTS OF BULKY FOODS

	Alb. %	Oil. %	Carbo. %	Crude Fibre. %
Cereal Straws:				
Wheat, oat, barley, and rye .	½ to 1	½ to ¾	33 to 40	39 to 44
Leguminous Straws:				
Peas, beans, thrashed clover	3 to 3½	0 to 1	30 to 37	34 to 42
Meadow hay . . .	3 to 7	½ to 1	35 to 41	21 to 33
Red clover hay . .	5½ to 8½	1 to 1½	36 to 37	24 to 30
Vetch hay . . .	9	1	32	25
Lucerne hay . . .	10	1	34	33
Green pasture grass . .	2 to 3½	½	10 to 10½	4
Green vetches, clovers, lucerne, sainfoin . . .	2½ to 3	¼ to ½	6½ to 9	5 to 9
Chicory	1	—	6½	½
Cabbage, rape, kohl rabi and swede leaves . . .	1 to 2	¼	4 to 8	1½ to 2½
White turnips . . .	½	—	7	½
Swedes and Mangolds .	1	—	10	1
Sugar Beet	1	—	16	1
Carrots	1	—	11	1½
Parsnips	2	—	20	1
Potatoes	2	—	20	1
Jerusalem artichokes . .	2	¼	15	1¼
Gorse or Furze . . .	3	1	8	13

SUMMER FEEDING

Hitherto the theory and practice of winter feeding has been mainly dealt with. In summer the basis of the dietary should be lawn or meadow herbage (usually called " grass "), which will take the place of hay and roots. The albuminoid ratio of spring grass is about 1 to 4, therefore it is, within limits, an almost perfect food for breeding and growing stock. Grass has only about 4% of fibre, its digestibility is therefore high, and it can be eaten in large enough quantities to supply all the needs of small animals. As a matter of fact, medium-sized rabbits seem to consume on an average about ¾ lb. to 1½ lbs. daily.

Wild rabbits live mainly on greenstuff, and afford an example of what a grass dietary can do for a rabbit in the matter of growth. We know that wild rabbits rarely exceed a weight of about 3 lbs. ; therefore, presuming that by natural selection a race best suited to the conditions under which it lives has been evolved, the inference is that an exclusively spring grass or greenstuff dietary cannot naturally grow a rabbit much larger than this weight. Rabbits of double the size would have a period of great leanness and weakness during which, if wild, they would succumb if reared solely on a dietary of greenstuff.

As nearly all the rabbits bred for flesh and fur are large, varying from about 6 to 10 lbs. in weight, it is obvious that it is not possible to grow them well on greenstuff alone even in the spring. Their dietary must be supplemented with 1 oz. or more per head daily of concentrated food, with about 15% of albuminoids.

Now although May grass has an excellent feeding value (alb. ratio 1 to 4) and rabbits do well on it, a point which is often, indeed usually overlooked, is that the second growth of grass, which comes in July and August after the first growth has been eaten or cut for hay, never has anything approaching the same feeding value, although the plants composing it may be abundant and look much the same. The albuminoid ratio of July grass is 1 to 7, and it widens still more later. In other words, there is something different (inferior) in the chemical composition of all greenstuffs grown during the shortening days, which makes them of poorer and poorer feeding value as autumn advances. Therefore it is not possible to grow even 3-lb. rabbits satisfactorily on grass late in the year, and a want of knowledge of this fact brings many breeders to grief annually, and leads to direct losses of hundreds of youngsters owing to ill-nourishment, and indirect ones owing to parasites gaining a foothold in weakly individuals.

The late summer and autumn greenstuff is an excellent filler-out, as it is fairly easily digested and supplies the bulkiest part of the ration in a cheap form ; but it must be supplemented with liberal allowances of concentrated food for all growing youngsters and nursing mothers. Under these conditions young rabbits born in August and September thrive almost, if not quite as well as those born in the spring, and, as far as the present writer's experience goes, there is very little anxiety connected with rearing them. On the other hand, youngsters born in September and fed on greenstuffs and cereals are frequently diminutive in size (in one case ½ lb. instead of 1½ lbs. at 6 weeks old), succumb to what breeders call " fits," and show on a post mortem examination a peculiar transparency and attenuation of the walls of the intestines which is presumably due to ill-nourishment owing to lack of albuminoids ; or else they fall victims to parasites, with which their internal organs become filled.

It must be remembered, therefore, that from early August onwards the allowance of concentrated food must be greater than that given to stock of similar breed and age in the spring, and that it must be gradually increased (irrespective of the amount of greenstuff available) until the winter maximum is reached in October.

PRACTICAL CONCLUSIONS

In case people of no experience should think that the method of feeding here advocated is likely to prove expensive, it is as well, perhaps, to point out that the change from the fancier's usual methods to a well-balanced ration will probably lead to a halving of the food bill. The oat is one of the most expensive of cereals, and, with its 25% of husk, requires to be given in such large quantities that it compares unfavourably in price with every other foodstuff of equal feeding value. If oats cost 1*d.* per lb., it will be easily possible to make up a better and more suitable concentrated food with a mixture of ingredients from the preceding table at a cost of ½d. per lb. or less. In other words, oats, whatever their current price may be, will probably cost about double the sum it is necessary to pay for a mixture that is—not equally suitable, but *better*.

TABLE SHOWING RELATIVE COST OF VARIOUS CONCENTRATED FOODS GIVING VERY SIMILAR RESULTS

—	Concentrated Food.	Cost of Amount consumed per head in 6 weeks.	Average increase in liveweight in 6 weeks.
Lot 1 .	Bran only . . .	2*d.*	1 lb. 9¼ oz.
Lot 2 .	Oats only . . .	4*d.*	1 lb. 10¼ oz.
Lot 3 .	Bran 2 parts, oatmeal 1 part, dairy cake 1 part. .	3*d.*	1 lb. 10¼ oz.
Lot 4 .	Dairy cake only . .	3*d.*	1 lb. 2¾ oz.

The above table, originally published in the *Journal* of the Board of Agriculture, and reproduced here by the kind permission of the President, shows that in a series of feeding experiments carried out in the summer of 1916 by the present writer to test the value of different foods, an almost equal increase in liveweight could be obtained at varying costs. Each pen consisted of two rabbits of the same age and breed, kept and fed in a precisely similar manner on a similar weight of food, the only difference made in each pen being in the nature of the concentrated food supplied.

A well-balanced ration at once leads to a decreased consumption of hay and other foods. It is the voracious rabbit, vainly endeavouring to obtain the nutritive substances it requires from non-nutritious material, that seems to eat so much.

Finally, by feeding so as to obtain the maximum of growth in the minimum of time, the greatest possibilities in the way of health and fertility, and so forth, the breeder gets the very most that is possible out of his stock, with the result that it increases and multiplies rapidly, he turns it over quickly, and by the end of the year probably finds that his profits are far in excess of his wildest expectations based on results obtained before he adopted scientific methods.

CHAPTER X

FOODS

No attempt will be made in this book to enumerate and describe the wild plants which can be given to rabbits. For one thing, the picking of quantities of one sort of plant and feeding it lavishly is the way to cause illness, and this method of feeding is not one to be recommended; while a list of common poisonous and deleterious plants has already been given. One thing is well known, and that is that the wild species of many of the plants commonly used as food for man and beast when cultivated, are often very unwholesome if not actually poisonous. Cultivation and consequent increase in size reduces the deleterious properties. Also, the common hedge plants do not seem to have been analysed, therefore there is no guide as to their approximate feeding value.

It may be taken for granted that a rabbit can eat anything a horse can. We do not set out a list of plants a pony can eat, so why should this absurd system be in vogue among rabbit keepers? If rabbit feeders will adopt the commonsense principle of feeding their stock in the way and with the foods given to farm animals, and will endeavour to benefit by the experience and knowledge gained from the study of the requirements of other classes of livestock, a great advance will have been made and less will be heard of digestive troubles in rabbits. Such complaints are practically unknown when rabbits are fed on a simple well-balanced ration, correct in quantity, varied in nature, and given in sound condition, and it is not incorrect to say that illnesses are mainly due to ignorance, prejudice, or carelessness on the part of the rabbit owner.

The system of feeding advocated in this book is the cheapest at present known. Economy in feeding is of course partly secured by using up more or less waste substances, such as outside cabbage leaves, etc., which are grown for human consumption in garden or allotment. All such things are very valuable if used with discretion—*e.g.* well mixed and balanced with other foods. The tables already given show the approximate feeding value of most classes of plants the feeder is likely to wish to make use of, and if the advice already given is closely followed, a maximum of success will be secured with a minimum of expense. No breeder, accustomed to the old-fashioned methods of the fancier, will realise the advantages which are gained by feeding with scientific correctness until he has tried it with an open mind.

ACORNS.—A carbohydrate or heat-making and fattening food. Acorns must be picked up when ripe (brown), and are best sprinkled with salt and stored until Christmas to further ripen before being used. Three to six thrown into the hutch whole once daily will be appreciated. It may be necessary to bruise or break them for the first time or two until the animals learn to know what they are. Green or unripe acorns blown down in early gales must not be used.

APPLES.—Whole apples or their peel are much liked, and although their feeding value is not great, they can be made to partially take the place of roots. They must be strictly limited in quantity, and must not be given until ripe (pips brown). An excess of apple leads to wasting and diarrhœa. The fresh apple pomace or residue after the juice has been expressed for cider-making contains the following digestible constituents: ¾% alb., ½% fat, 12% carbo., 2½% fibre, and would form the basis of a feed if mixed with suitable meals, etc.

ARTICHOKES (*Helianthus*).—Jerusalem artichokes are particularly valuable to the rabbit breeder, because (1) they do well in poor, heavy soils which will not grow good roots or potatoes, and can be grown again and again on the same plot of ground; (2) have a good feeding value; (3) are particularly liked by rabbits; (4) yield a very heavy crop; (5) are, comparatively speaking, frost proof, and can remain in the ground to be dug as required during the winter. This last peculiarity is one of importance to those short of storage room for such bulky things as roots. Artichokes contain 14% to 15% of sugar, 2% to 3% of albuminoids, and about 76% of water, and should have hay fed with them in the proportion of about one-third their weight.

The tops can also be fed fresh or dried, but mature (dying) stalks should not be given freely, as rabbits are apt to eat too gluttonously of the hard and indigestible material. Artichokes are grown from sets or tubers planted in the spring, and should certainly be put in odd corners where their height will not interfere with the growth of other crops.

BARLEY AND BYE-PRODUCTS.—Barley (*Hordeum*), whether whole or ground up in the form of meal, is not desirable as the only concentrated food for stock except when used temporarily for the last week or two of the fattening period prior to killing.

Barley is a heating and fattening food, and to be used profitably must be combined with other substances containing a high percentage of albuminoids. Irritation of the skin is produced by feeding barley in excess. Thin hard barleys unsuitable for malting are generally the best for feeding.

Barley meal should be white, sweet, and free from an undue admixture of husk, and should always be given damped or in the form of what fanciers call a mash. It weighs about 42 lbs. to the bushel.

Malt coombs, culms, or cummins are the sprouts removed from malted barley by screening, and are much liked by all classes of stock. They have a very low percentage of digestibility, however, so must be carefully fed combined with other substances chosen for their digestibility, especially when used for breeding stock. Cummins are liable to go mouldy, and must be stored in a dry room. They weigh about 14½ lbs. to the bushel.

Brewers' grains are a valuable bulk food if used fresh before they become acid or mouldy. Sour grains have a deleterious effect if used daily for any length of time. Wet grains weigh about 40 lbs. to the bushel.

As dried grains are often easily procurable in these days in cwt. sacks, in which condition they keep any reasonable length of time if stored in a dry place, most feeders will prefer to secure them in this state. One cwt. is usually reckoned to be the equivalent of 4 cwt. of wet grains. Dried grains are best given after being soaked for some hours with about an equal weight of water and then dried off with meals, etc., as soaking increases their digestibility, which is low. Care must be taken that the soaked grains do not become sour in hot weather. Dried grains weigh about 20 lbs. to the bushel.

There is considerable difference in the percentage of albuminoids in dried grains, best ale grains often containing over 20%. It is doubtful, however, whether much importance need be attached in practice to differences of analysis in any feeding-stuff which do not exceed about 5%.

Distillery grains may contain other cereals than barley, and have a somewhat higher average feeding value than brewers' grains.

Malt (sprouted barley, wheat, or oats) at one time had a great reputation as a feeding-stuff, but modern opinion is to the effect that the process reduces the feeding value, and that therefore the practice is not one to recommend.

BEANS (*Faba*).—Beans, peas, and tares (vetches), when freshly ground into meal, are valuable for mixing with cereal meals for increasing the percentage of albuminoids. They must be fed with caution, however, should never exceed one-quarter of the total concentrates fed, and should be well opened up with bran or an equally bulky material. When buying bean or pea meal for rabbit feeding, it is desirable to ascertain the precise variety of pulse from which the meal is made. English-grown leguminous plants are safe enough, but many cases of poisoning of animals have arisen from the injudicious use of foreign pulses, such as Java beans and Indian peas, and Soya beans are not above suspicion under certain circumstances. With due precautions as to variety, quantity, and mixture, however, these grains are a most useful addition to the dietary.

BEECH MAST has not a good reputation as a safe food and is best not used.

BRAN.—Bran is the coarser part of the seed coat or outer skin of wheat, and is valuable for opening up highly concentrated foods. There is probably insufficient practical difference between broad bran and ordinary bran to warrant the rabbit keeper paying a difference in price. The bran worth most money is that sample which leaves the hand covered with white flour, and bran should always be tested for this by plunging the hand into it.

Bran does not keep well, and it is usually advisable to buy no more than about a fortnight's supply at one time.

Stale bran has an unmistakable odour from which freshly ground stuff is totally free. It keeps best if turned out of the sack into an airtight bin, and its wholesomeness may be preserved for a reasonable time in winter if this precaution is taken. Bran weighs about 17 lbs. to the bushel.

Bran does not possess a very high digestibility, so that its actual feeding value is rather less than its analysis would suggest, though it is a food which seems to suit rabbits well enough. It is best given damped and dried off with other ingredients in the form of meals. It should not be wetted long before use, however, as it quickly sours. This damping has very little if any effect on the action of the food, and must not be confused with a bran mash, as is frequently done by fanciers.

A bran mash is made by pouring 1 pint of boiling water on to 1 lb. of dry bran, throwing a handful of dry bran on top, covering over the bucket, and leaving the mixture undisturbed for at least half an hour, or till cool enough to feed. The result is a laxative food, which is useful for invalids requiring this class of dietary, but unsuitable for the regular daily feeding of livestock, as the bran is said to be rendered less easily digested.

CABBAGE TRIBE (*Brassica*).—Fanciers have an objection to feeding cabbage leaves because of the unpleasant smell which is apt at times to follow their use (especially when they are stale) in the rabbitry. This reason is hardly sufficient, however, to debar the use of such an economical and valuable foodstuff, and plants of the cabbage tribe ought to be freely grown for winter use. They are almost the only greenstuff available through the winter, contain a higher percentage of nutritive material than roots, and afford a most valuable change during the open weather. It is hardly possible to find a better, and at the same time more economical winter dietary than hay, cabbage or kale, and concentrated food. Roots should be kept for use in frosty weather when greens are not available. Most plants of the cabbage tribe will give two crops for rabbit feeding, the first from early autumn until after Christmas, after the gathering of which the stumps will shoot again in the spring, and they can eventually be pulled up bodily with their new growth, split, and used up for feeding almost completely.

For winter use the seeds should be planted in a seed bed in the spring, the plants transplanted in June or July, and, if judiciously chosen as to variety, a succession of winter greens will then be secured, many if not all of which are equally suitable for household use. Cattle cabbage is exceedingly hardy, and yields immense hearts for autumn use; thousand-headed kale and rape, which can be seeded down where they are to stand if desired, are favourite sheep foods; while the ordinary garden cabbages, kales (curly, cottagers', etc.), broccoli, all yield an abundance of green-stuff, the broccoli leaves and stumps chiefly coming in May when the Kales are over. Plants of the three types, cabbage, kale, and broccoli, will carry the rabbit feeder from September to May during all the open weather. The open-headed varieties are the only ones which will stand right through the winter, so that the cabbages must be used first before the severe frosts come.

Kale when shooting makes stock very thirsty; it must therefore be fed with discretion when running up into flower, as it is acrid and less wholesome at this stage.

Although they are actually of slightly better feeding value, it will be found in practice that about the same quantity by weight of winter greens as of roots should be given per head daily.

Plants of the cabbage tribe will grow sufficiently well for the purpose of rabbit feeding on poor soils in which they fail to make hearts or flowers up to the standard required for human consumption, so that inferior land need not debar any one from putting in a plot for the rabbits.

CARROTS.—Owing to their richness in sugar, and to a tonic and exciting essential oil, carrots are liked by all stock, and have a reputation for being wholesome and easily digested. In consequence of their use for human consumption they usually fetch two or three times the price of Swedes, and it is well recognised among stock feeders that their feeding value does not warrant their use at a much higher price than that which has to be paid for other roots.

Carrot-tops must be used in very moderate quantities, for they soon cause indisposition if fed in excess.

CHICORY.—This plant is a very useful one to grow for rabbits if treated as a biennial, for it thrives in poor, heavy soils, does not require heavy manuring, and is very easily cultivated. It is a fairly safe green food for stock of all ages, but does not go very far, immense quantities being required to furnish a satisfying meal. A plot should be planted every year, the best variety being the Belgian or Giant Witloof.

The seed should be planted in May (or whenever there is no fear of frost), in rows 12 inches to 18 inches apart, 1 inch to 2 inches deep, in ground free from recent manure. Germination is rather slow, but the plants grow quickly when once established, and when large enough should be thinned 9 inches to 12 inches apart. Gaps can be filled up by transplanting. A first cutting may usually be expected in about two months from the time of planting the seed. Subsequent cuttings depend much upon the weather, but in a fairly favourable season the same plants will be fit to cut about every four weeks until October, when rapid growth ceases. The roots are left in the ground with a good head, and growth commences again early in the following spring and affords frequent cuttings until about July, when a newly planted crop should come into use. It is uneconomical to let the second-season chicory run up into 4 or 5 feet high seed heads, as the rabbits do not care for, and waste a good deal of the hard stalk. In the late summer the old crop can be lifted bodily and all sound plants fed to the rabbits. Chicory roots can be sprouted in the winter if stored in boxes in a warm (60°) cellar; but it is doubtful if it is worth doing, as winter greens can be more easily procured by planting plots with various crops of the cabbage tribe.

CLOVERS.—Clover is encouraged in a pasture by the use of basic slag, and as it has a good feeding value, it is a valuable plant to include in a mixture.

Clover hay is one of the richest fodders in albuminoids of its class, and if of first cut and of good quality, is more valuable than meadow hay. A lot depends, however, upon the time of cutting, making, etc. Second-cut clover hay, full of hard stalks, would probably be worth less as food than good meadow hay; and as clover hay is more liable to be mildewed or mouldy, is more difficult to "get" or make in good condition with the leaf intact, it must be purchased with discretion. Clover meal, as used for feeding fowls, is not worth more than clover hay price for rabbit feeding even if unadulterated and of good quality, because rabbits can bite up the food for themselves, and therefore it is waste of money to pay for its being ground into meal for them. Thus if clover meal is 12/– per cwt. and a fair sample of hay 4/– per truss of 56 lbs., it is obvious that it will be most unprofitable to buy the meal.

Good clover hay is sweet in scent, rich brown in colour, and full of flowers showing colour, and of leaf.

There are usually several species of clover to be found in a pasture, but the differences in feeding value between the red, crimson, white, trefoil, etc., are so slight as hardly to warrant more than passing allusion.

Coconut Cake.—This is the residue left after the oil has been removed from the "copra" or dried fleshy kernel of the coconut. The cake should be greyish brown in colour, with a pleasant nutty smell and taste. It must be chosen with discretion, for it does not keep well, and if fed when rancid produces acidity. With some 16% or 17% of digestible albuminoids and a rather high percentage (15) of fibre, ground coconut cake or meal mixes well with maize meal and pollards or bran, and is much liked for rabbit feeding on the Continent. It is best soaked for some hours in water in order to get a moist, crumbly meal, which can be dried off with the other ingredients of the concentrated food. It is a useful food to use to replace roots when these are scarce or lacking.

Cotton Cake (*Gossypium*).—This is made from the seed of the cotton plant, and is bright yellow in colour. Only the decorticated (dehusked) cake or meal should be used, as the husks are very indigestible, and the cheaper undecorticated cake is likely to prove very costly by reason of the mortality which may result from indigestion. Nor should cotton cake be given freely to youngsters.

Cotton cake or meal, which is the form in which it would be used in the rabbitry, is far too rich to give alone, and should be mixed with maize or barley meal and bran in the proportion of one of cotton cake to 3 or 4 of the other ingredients. It is a binding food, and most useful to use in conjunction with rather laxative substances. Cotton cake must be stored in a dry place, and arranged so that air can circulate freely round each cake. The average weight of one cake is usually about 14 lbs.

Concentrated Food.—This term is used to indicate cakes, cereals, etc., with a high percentage of nutritive principles, which because of their good feeding value are used in small quantities to balance or supply deficiencies in the feeding value of a ration mainly composed of coarser and cheaper bulky foods.

EARTHNUT CAKE (*Arachis hypogoea*).—This is also called ground-nut, monkey-nut, or pea-nut, is obtained from the common monkey-nut, and can be had shell-less or decorticated, or undecorticated. The former only should be used, of which there are two varieties, "Rufisque," the best, and "Coromandel," which is rather less reliable. Much the same remarks apply with regard to feeding this cake when ground into meal as were made with regard to cotton cake.

FISH MEAL.—The best fish meal is made from fresh white fish only, and contains a maximum of 3% of oil and less than 2% of salt. It is a rather coarse, granular heavy meal of a greenish colour. Fibrous yellow meals, and meals with more than 3% of oil should be avoided.

There is no better or cheaper albuminoid food for rabbits than the best fish meal judiciously blended. It contains between 15% and 20% of phosphates for bone making, and youngsters grow and develop on it in a remarkable way. Like all other very rich substances, however, it must be used with great discretion. One ounce between four young growing rabbits of large breeds, or one ounce between six smaller or older animals is as much as is required daily, mixed with three or four times its weight of cereal meals. The present writer has obtained excellent results with 3 ozs. fish meal mixed with 13 ozs. bran, this amount (damped before use) being distributed in autumn once daily between 15 rabbits ranging from 7 weeks to 5 months old, and keeping them growing and thriving in the best manner possible with grass and greenstuff as the only additional food. In the spring one ounce of fish meal between eight youngsters would probably be sufficient. Fish meal keeps well in a dry place if turned out of the bag into a bin or box.

GORSE, FURZE, OR WHIN.—The young green shoots can be used in moderation as food, but the seeds are best withheld.

GRASS.—Meadow grass in its natural state or dried into hay is the mainstay of the rabbit feeder and should form the basis of the dietary. It varies in quality, having an albuminoid ratio of 1 to 4 in the spring and 1 to 7 in August, and a still wider ratio as the year progresses. This depreciation in feeding value must be made good by increasing the albuminoids in the concentrated food of growing youngsters in autumn.

Breeders who have no grass plot can supply the deficiency by planting a piece of arable with one of the mixtures for permanent or temporary pastures sold by all agricultural seedsmen. Mixtures are made up to suit the character of the soil, and to stand either one, two, three, or four years, or permanently.

The following is a typical three-year mixture for heavy soils, the amount specified being suitable to seed down an eighth of an acre :

	lbs.	ozs.		lbs.	ozs.
Italian rye grass	0	8	Meadow fescue	0	6
Cocksfoot	0	12	Perennial red clover	0	4
Timothy	0	6	White clover	0	4
Broad red clover	0	4	Meadow Foxtail	0	4
Alsike	0	4	Hard Fescue	0	4
Trefoil	0	4			
Perennial rye grass	1	4		lbs.	5

GREEN CROPS.—Lucerne, sainfoin, and vetches are all practical forage crops which can be successfully grown on a small scale by rabbit keepers to be fed green or made into hay. They will be dealt with under their respective headings.

HAY.—Hay varies enormously in quality and feeding value according to the time at which it was cut, the soil upon which it was grown, the way in which it was "saved," etc

The commonest evil is late-cut hay. The grower often delays to cut in the hope of obtaining a greater bulk of undergrass, with the result that much nutriment is lost. It is essential to a good nutritive hay that the crop should have been cut whilst the majority of the grasses were still in flower, which in the South of England is rarely later than about June 14th. Late-cut hay can be easily recognised by the absence of flower heads, their place being taken by seeds which drop off, or maybe, if the crop has been left until late in July, by bare stalks devoid even of seeds. These stalks are worth no more than straw for feeding purposes, Some experiments undertaken with sheep showed that whereas 75% of the hay cut in the middle of May, and 64% of that cut in the middle of June were digested, only 57% of that cut on June 26th, and still less of a later crop had a nutritive value.

The plants which compose hay depend mainly upon the soil upon which the stuff is grown ; but this point is of much less practical importance for rabbit feeding than an early cutting of the crop, because coarse, weedy herbage unsuited for horses is much appreciated by rabbits if cut early with a large proportion of nutriment in it.

Hay which has been cut early and well saved will be green in colour and full of aroma. Rain falling on hay causes it to lose both these characteristics, and a long exposure to weather makes it dingy, washed out, and brown in appearance and free from an agreeable odour. The constant turning in unfavourable weather also leads to much loss of the small leaves and grasses which are the most nutritious part.

Mow-burnt hay is very dark in colour and strong in smell, the condition being due to overheating in the stack. Animals are often very fond of it, but it is not desirable to use it for feeding, as it is apt to set up kidney troubles.

Dust in hay may arise from the stuff having got slightly damp and dried again quickly without actually passing into a mouldy state, the apparent dust being the decayed outer coats of the stems and leaves ; or it may come from the hay having been over dried ; or it may be due to a blight having fallen on the growing crop. To whatever it may be due, it is a most unfavourable feature, and it must be especially avoided by rabbit feeders, as it is possibly one of the commonest causes of the sneezing which precedes Snuffles.

Hay should not be used earlier than November of the year in which it was made. Mouldy wisps should never be given, as they may sometimes possibly be the cause of liver disease. A truss of old hay weighs 56 lbs.

HORSE CHESTNUT.—These are sometimes given ground up in small quantities, and are not injurious to rabbits.

IVY.—Rabbits are fond of ivy leaves, and seem to be able to eat them in winter with impunity.

KOHL-RABI (Cabbage-turnip).—Closely allied to the cabbage, of which it partakes in nature, its chief characteristic being a swollen stem, which in the big-topped varieties stands frost well and is valuable for winter feeding. Kohlrabi can be grown on land too heavy for swedes, and can be left in the ground until required for use. Then it is lifted bodily and fed at once in open weather.

LINSEED (*Linum usitatissimum*).—This is the seed of the flax plant, and is most commonly used for feeding animals in the form of a cake made from the ground seed after most of the oil has been extracted. Good linseed cake is greyish brown in colour, free from grittiness or bitter flavour when tasted, free from visible husks when broken up, and swells into a thick jelly when one quart of boiling water is poured on to ½ lb. of ground cake.

The cake may contain from 8 to 16% of oil, those that are softest in texture usually containing the greatest proportion.

Linseed cake (ground) is excellent for mixing with cereal meals in the proportion of about one part to two parts of meal for young animals and show stock, as it is easily digested and gives a wonderful bloom or finish to the coat.

Pure linseed contains some 35% to 36% of oil, and the whole seeds, put into the concentrated food in suitable proportion, are as valuable as the cake, and more easily procurable by many people. Linseed meal is the ground seeds, and if freshly prepared, is more convenient to use than the whole seeds. When purchased from a grocer ready ground, however, it is as likely as not stale, and possibly mouldy, so that it is usually safer to use the seeds whole if it is impossible to grind them up at home.

Linseed oil, as purchased from a chemist, is as useful for imparting a gloss to the coat as the seed or cake if a saltspoonful per head is mixed with the concentrated food; but the use of the whole seed is usually the best way of gaining the object desired. Linseed has a particularly soothing action on the lining of the intestines, and a bottle of the pure oil should be in every medicine cupboard for use in cases of colic or intestinal derangement.

Linseed in any form is too expensive as a rule to use as part of the regular food of ordinary or utility animals. Its use is justified in the case of invalids recovering from illness; or for a week or two for stock being prepared for show or sale. The whole seed can, if desired, be soaked for twelve hours in cold water, stirring periodically, when it will form a jelly-like mass into which meals are mixed; or it can have boiling water poured over it, in either case the proportion being 1 quart to ½ lb. seed.

Bran and linseed mashes are useful in the case of invalids, especially when recovering from colds, etc. Take ¼ lb. of bran, 2 ozs. linseed, a pinch of salt, and add ¾ pint of water. Boil gently for one or two hours, stirring frequently, and give when cool either alone or mixed with meal.

Linseed cake must be stored in a dry place and arranged so that the air can circulate freely between each cake. If mouldy, it should never be used. Nor is it advisable to soak linseed in any form for a long time before use, as under certain conditions favoured by moisture it is apt occasionally to develop poisonous qualities. The average weight of one cake is about 12 lbs.

LOCUST BEANS (*Ceratonia siliqua*).—A carbohydrate, not an albuminoid food, as the name might suggest, and consisting usually mainly of the pods of the locust bean or carob tree. They are used in most compound cakes and meals, to which they impart a sweet taste and pleasant smell.

LUCERNE OR ALFALFA (*Medicago*).—A valuable perennial forage crop with a good feeding value. The seed should be sown on good clean land in April, with or without a proportion of oat seed or some other cereal to hold the young growth up, and will afford a cutting in the following autumn. The following year and thereafter it affords several cuttings in the year, and if kept free from weeds will be productive for several years. Lucerne is a drought resister and suited to rich, heavy soils. In cold districts it should not be cut down closely late in autumn when there is a prospect of frost, but should be left with a good top, or the newly cut plants may die of cold and want of protection in winter.

MAIZE (*Zea mais*) AND ITS BY-PRODUCTS.—Maize is best known in its grain or seed form, but if a variety such as White Horse Tooth be planted in very rich soil in June in the southern parts of England, a heavy crop of succulent green food can be cut for feeding in August and September.

The cereal is an oily, heating food, valuable for mixing with substances containing a high percentage of albuminoids and deficient in carbohydrates, but unsuitable for feeding alone, as although it fattens quickly, the stock fed on it have a yellow oily fat. Maize weighs 60 lbs. to the bushel.

Flaked maize is the term applied to maize which has been cleaned, crushed, cooked, rolled into " flakes," and dried. Its feeding value is practically the same as raw maize, except that the cooking may decrease the digestibility. When thus prepared, it is sometimes sold under fancy names, such as " Kositos," " Uveco," etc., and it is obvious that it is not profitable to pay for treatment which in no way adds to the feeding value. " Homco " is maize bran or the outer portion of the seed.

The by-products of maize are of greater feeding value than maize itself, as they all contain a higher percentage of albuminoids.

Maize germ meal of a good make is little better than maize ; but gluten feed and gluten meal, which are obtained as residues after the starch has been extracted, are valuable foods to mix with other cereals. Gluten meal is rather lower in fibre, higher in albuminoids and oil, and poorer in carbohydrates than gluten feed. The latter mixed with an equal weight of bran is an admirable rabbit food with a tendency to fatten.

MANGOLDS (*Beta maritima*).—The varieties in cultivation are either globular or oblong in shape, and red, orange, or yellow in colour. The Golden Tankards and Long Reds usually have rather the best feeding value ; but a good deal also depends upon the precise strain and method of growth. The Orange and Yellow Globes are perhaps the most commonly grown, as they are the most suitable for every class of soil. Mangolds weigh about 45 lbs. to the bushel.

Sugar Beet is simply a variety of Mangold selected for its high percentage of sugar, which in a good strain may exceed 16%. It is more susceptible to frost than Mangold.

Mangold-tops or leaves should not be fed to rabbits.

The roots when first pulled are also very unwholesome and cause scouring, and they must be stored where they are safe from frost until they have had time to ripen. It is generally reckoned that they will be fit to use by the first week in February ; but, within limits, the longer their use is deferred the better is their feeding value. When pulled, the leaves are usually twisted off and ultimately thrown away, as they are not a desirable food ; and when feeding the roots the crowns should also be cut off and thrown away.

Mangolds are most useful roots for feeding early in the year, and are much relished by all animals; but they must be used with caution and in strictly limited amounts, as, apart from their fattening qualities, they are not, even when ripe, entirely free from a tendency to a purgative action.

Roots grown on sewage farms should not be used.

The allowance of all roots per head daily should not exceed about 1½ oz. per lb. liveweight. When fed in excess, roots tend to decrease the digestibility of all the other food consumed.

MOLASSES.—Cane-sugar molasses can be used to condition stock or to make inferior foods palatable, and is preferable to beet molasses, which is too laxative. Molascuit is the pith or finer parts of the sugar cane used as an absorbent for molasses; Molassine is sphagnum moss used for the same purpose; Molastella has a basis of tapioca meal. All these make useful conditioners, but the same result can be got more cheaply if the feeder adds molasses himself to his feeding-stuffs. About 1 oz. molasses dissolved in 4 ozs. warm water is sufficient to pour over the concentrated food of 5 or 6 medium-sized rabbits.

OATS (*Avena*).—This cereal has been almost the only concentrated food advocated for rabbits by English fanciers for many years past, and the result is seen in the comparatively small size to which English breeds of rabbits have dwindled. Oats form a useful concentrated food for adult rabbits if fed in sufficient quantities; but they have too low a percentage of albuminoids to grow good rabbits of over about 5 lbs. in weight at any time of year except May, June, and July, when grass and green food naturally have a high feeding value. In any case the oat is almost if not quite the most expensive of all the cereals, for the proportion of husk varies from 23% to 33%, and this husk is reckoned to have no better feeding value than straw. Whole oats contain a stimulating or exciting substance called *avenine*, which is lost if the grain is crushed or ground.

Thin black foreign oats often have a lower percentage of husk than the plump-looking white oats beloved by fanciers. There is probably no appreciable difference in the feeding value of black or white oats other than this point of the proportion of husk which is not necessarily influenced by colour.

Oatmeal or huskless oats contain a higher percentage of albuminoids than whole oats, but still not enough to use as a single concentrated food for growing youngsters.

Good oats weigh 42 lbs. to the stroked bushel. Very inferior samples may weigh 10 lbs. less, a fair average being 38 lbs. They should be clean, bright, dry, hard, plump, and sweet, and free from an admixture of weed seeds.

Foxy oats have acquired their characteristic reddish colour and bitter smell and taste through being heated, and have an injurious effect on the kidneys if used as food. Damp, mouldy, musty, or sprouted oats are also undesirable to use.

Oats, like maize, are a "heating" food owing to their comparative richness in oil, and it is the present writer's opinion that their use in hot summer weather has much to do with the dropping of the ears of naturally upright breeds of rabbits. When conducting some feeding experiments on several lots of rabbits fed and housed under precisely similar conditions with the exception of the nature of the concentrated food, the ears of the rabbits receiving oats "lopped" during a heat wave, while the ears of none of the other rabbits were seriously affected. Again, cavies fed on oats are apt at times to get heated skins, which cause them to bite and scratch bare patches on their backs. This trouble has never been experienced since abandoning the use of oats.

PALMNUT OR PALM KERNEL CAKE.—This cake is light grey in colour with dark specks in it, and is made from the residue of the kernels of the nut of the African oil palm (*Elæis guineensis*). The meal is very light and loose, and should be used combined with, say, pollards or oatmeal, and a small proportion of bean or pea meal, the whole being moistened with cold (not hot) water. Palmnut cakes are reputed not to keep very well, as the oil goes rancid; therefore the stuff must be bought with discretion. It is a particularly useful food when roots are scarce or lacking.

PARSNIPS.—These can be used instead of carrots, but are not much liked by rabbits until the spring. They are hardy, and can remain in the ground all the winter.

PEAS (*see also under* BEANS).—The haulm of garden peas is a useful rabbit food either given when the crop is gathered or dried on the sticks by being pulled at the root, and then stored for winter use. If mildewed it should not be used.

Pollards.—Has a rather better feeding value than bran, and is useful for combining with a laxative food.

Potato.—Boiled in their skins, the water thrown away, then mashed up with meals in suitable proportions, potatoes often form a cheap basis for the concentrated food. Their value is mainly dependent upon the cost of cooking them. If coal, gas, or oil has to be specially used to cook them, it is probable that a substitute, which can be used raw, will be more profitable. Diseased or unsound tubers should not be used; but small "pig" potatoes are highly suitable. Combined with cereal meals and milk, potatoes are considered on the Continent to be one of the finest fattening substances possible to use during the last three weeks. Combined with fish meal and bran, or with one of the cattle meals, in proportions to bring the albuminoids up to the correct standard, they are equally useful for breeding stock.

Neither raw potatoes, raw peel, nor "greened," sprouted, or diseased tubers must be used, as, like the green haulm, they are all more or less poisonous. Household peelings must be boiled before inclusion in the rabbit food, and the water thrown away.

Rape (*see also under* Cabbage).—A useful plant to grow as a catch-crop after early potatoes for rabbit feeding; but probably some of the other plants of the cabbage tribe will suit most rabbit feeders as well or better.

Rice.—Rice meal, if of good quality unadulterated with the strawy outer husks, but including the bran, and cheap, is a very useful basis for the concentrated food of growing animals if brought up to the standard required by mixing with it foods rich in albuminoids. The outer husks or shudes are of no value as food.

Sainfoin (*Onobyrchis sativa*).—This perennial will replace Lucerne as a forage crop on poor and chalky soils, arid and burnt by the sun and of no depth. It is sown in the spring, and is treated in much the same way as lucerne, standing many years if it is not allowed to become choked with weeds. Like Lucerne, it is at its best as regards feeding value if cut before coming into flower.

Sharps.—This bye-product of wheat is so much like bran in analysis that it is hardly worth paying nearly double the price of bran for it for rabbit feeding. In practice these animals seem to thrive quite as well on bran as on sharps; and it is obvious that bran *and* sharps is not a suitable mixture as far as obtaining a concentrated food up to the standard is concerned.

Good sharps is pinky white in colour, and free from a musty or strong odour.

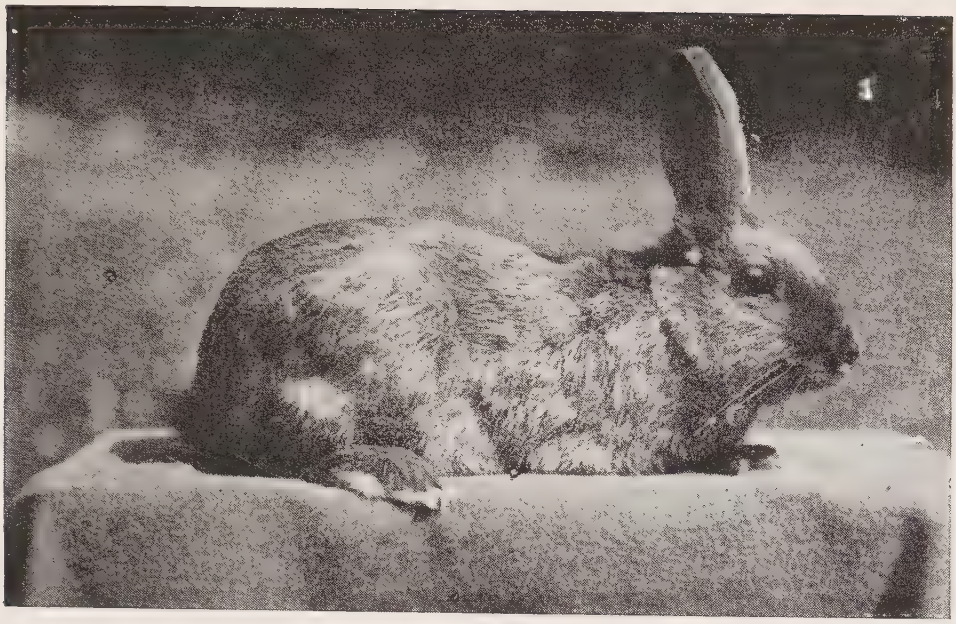
SOYA BEANS.—These beans are about the size of an ordinary pea, usually yellow in colour, and obtained from a plant (*Glycine hispida*), much grown in the East. The beans themselves are very rich in oil and are not recommended as food; but a cake, of a greyish colour, made from the residue after the oil has been expressed, is, when ground into meal, most excellent for rabbit feeding if mixed with suitable proportions of cereal meals, and used much in the same way, and in place of decorticated cotton cake meal. It is rather more laxative than the latter, and so very useful when roots are scarce or lacking.

SPROUTED GRAIN.—The effect of sprouting is to decrease the digestibility of all grain.

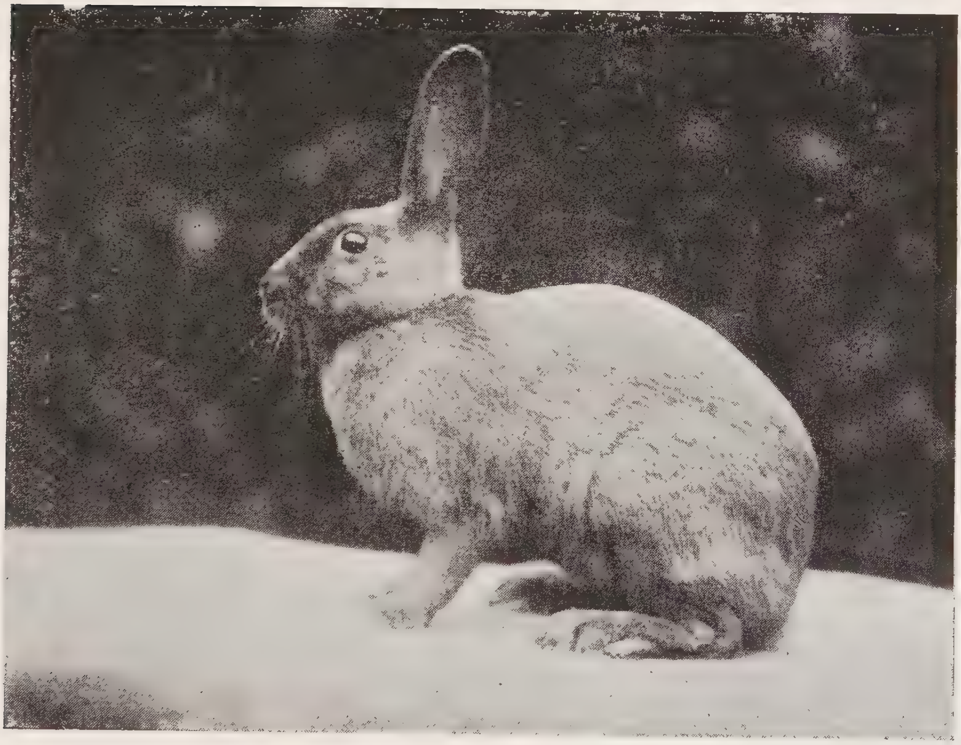
STRAW.—As rabbits require filling up with a certain amount of cheap, coarse stuff, straw can be used for adult animals in place of hay if the latter is unobtainable without serious loss of condition if the deficiencies in the way of albuminoids are made good by increasing their proportion in the concentrated food. Wheat straw is poorest in feeding value; oat straw the best. Barley straw should not be used. If the straw is chaffed, mixed with pulped roots some hours before use, and the whole finally dried off with concentrated food, the straw is made rather more digestible and appetising. Rabbits will, however, pick over and eat the best parts of straw if given a liberal amount, and what is left can be used as bedding.

SUGAR BEET (*see* MANGOLDS).

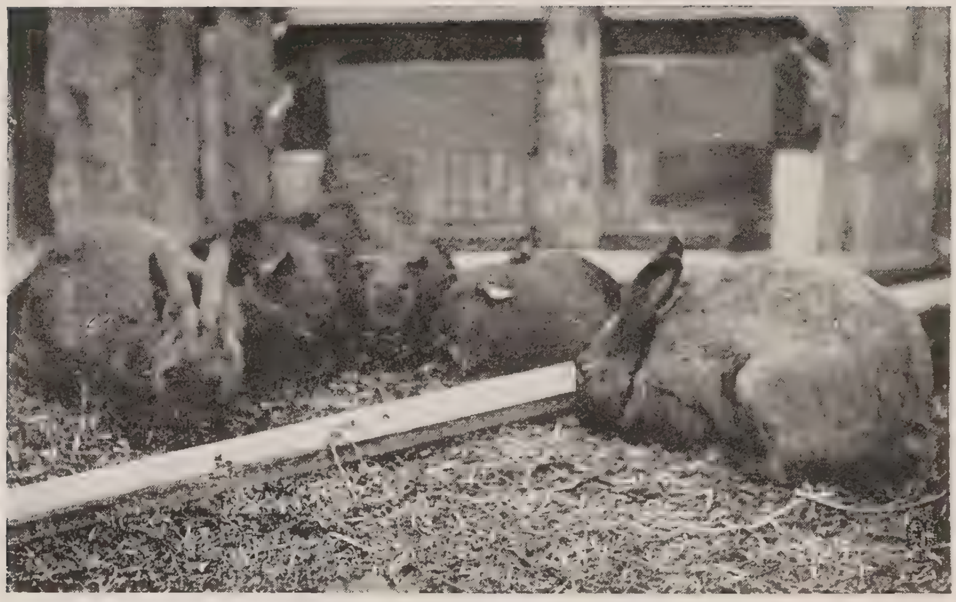
SWEDES (*Brassica Rutabaga*).—This variety of turnip is hardy, and can be used for feeding as soon as the roots are pulled at the end of October. The roots usually keep fairly well if stored with protection from severe frost, and can be fed until the mangolds are ripe in February or later. The feeding value of swedes varies greatly according to the land upon which they are grown, some samples having but 8%, others as much as 15% of dry matter. Medium-sized



ADULT HAVANA BUCK.



HAVANA DOE.
(*Four to five months.*)



RABBITS AND CAVIES IN A PEN ON GRASS.

SILVER GREY BUCK TETHERED ON A LAWN.

bulbs are better than very large ones. Fed in correct quantities, they afford one of the cheapest of the bulky winter foods, and are eagerly devoured by rabbits once they have developed a taste for them. The tops are much like cabbage leaves, and can be fed when the roots are pulled. For quantities, see under "Mangolds." Swedes should be pulled before the first severe frosts come, should have the tops cut off, and should lie in heaps for a few days to sweat, covered over at night by the tops. When the mud left on the roots is quite dry they can be taken in and stored. Swedes weigh about 45 lbs. to the bushel.

TARES (*see* VETCHES).

TREACLE (*see* MOLASSES).

TRIFOLIUM.—Trifolium, or Crimson Clover, has a rather poorer feeding value than Lucerne and Sainfoin, but it may be useful to grow for cutting if a temporary forage crop to stand one or two years only is preferred to a perennial.

TURNIP.—White-fleshed turnips contain a very small amount of nutriment and cannot be stored long, so must be consumed, top and root, before the frosts come.

VETCHES.—Tares are extremely valuable to grow if a forage crop of high feeding value which will only occupy the ground a short time is required. Winter vetches can be sown in the autumn to afford greenstuff in early summer ; or summer vetches in February or March for use about 6 months later. They do well on heavy land, and are usually sown with an equal quantity of the seed of a cereal such as oats to act as support.

Vetches should be cut for feeding when in bloom or earlier. They deteriorate rapidly in digestibility when the seeds begin to ripen.

When feeding green vetches, cereal foods alone are sufficient as the concentrated part of the ration, and foods rich in albuminoids should be withheld.

CROPS TO GROW

Heavy Soils.	Medium Soils.	Light Soils.
	For Winter Feeding	
Mangold Cabbage, kale, etc. Artichokes	Kohl-rabi Potato	Turnip and Swede Carrot Parsnip
	For Summer Feeding	
Vetch Broad Red Clover Alsike Chicory	Lucerne Crimson Clover	Sainfoin White Clover

LAND REQUIRED FOR CROPS

The French estimate that to grow sufficient food to supply all the requirements of 9 bucks, 95 does, and their 2,280 progeny born in the year (in round figures, 2,400 rabbits), five acres is required cultivated approximately as follows:

CROP	AREA OF LAND
Oats	2 acres
Cabbages . . .	1¾ ,,
Lucerne . . .	1 rood, 23 poles
Clover . . .	1 rood, 8 poles
Potatoes . . .	32 poles
Carrots . . .	23 ,,
Mangolds . . .	13 ,,

QUANTITIES OF FOOD REQUIRED

As it is usually far cheaper, and in most years prudent to buy the winter supplies of food in bulk in early autumn, those who have room to store it will naturally desire to do so. The novice is often at a loss, however, to know how much of any given foodstuff he is likely to want to carry him comfortably through the winter. The average amount of food required by a rabbit has already been given, and from this each breeder can, if he desires, make his own calculation.

Estimating that medium-sized rabbits will have to live on bought food for 182 days, the present writer finds in practice that the following amounts are a satisfactory working basis when ordering supplies:

Hay: Nearly ¾ truss per rabbit; or, say, 4 trusses for every 6 rabbits.

Roots: About 1 cwt. per rabbit.

Concentrated food: About 23 lbs. per rabbit; or, say, with economy, 1 cwt. for every 5 rabbits.

These figures allow for a little inevitable waste in hay, for trimming roots, etc. At the present exorbitant prices of feeding stuffs, with hay at 3/6 per truss, roots 2/– per cwt., and concentrated food 2*d.* per lb., the cost of keeping a rabbit for the winter works out in round figures to about 8/6. Most breeders will be able in practice to reduce the cost by the use of a proportion of home-grown produce.

It is more difficult to estimate the weight of green food likely to be required in summer, but in some French experiments the average amount consumed daily from birth to killing age worked out to about ¾ lb. per head. If a rabbit consumes this amount (and large animals will eat much more), it will require about 274 lbs. in the year, or 1¼ cwts. during the six summer months in addition to concentrated food. It is hoped that these rough estimates, if they serve no other purpose, will help to bring home to breeders the fact that rabbits do not live on air, as fanciers sometimes seem anxious to lead the novice to suppose, and will demonstrate that it is easy to overstock and find oneself in the unhappy position of having insufficient cheap food to supply the needs of a large stud in the most economical manner possible.

CHAPTER XI

BREEDING

The most natural breeding season of the rabbit is from early spring to late summer. Fanciers usually desire to breed all the year round, so as to obtain a regular supply of youngsters for table purposes or exhibition at every season of the year. The best prices for table rabbits are given from September till April, therefore winter litters are almost as profitable to rear as summer ones. The difficulties experienced by most breeders are first of all to get winter litters, and when they have arrived to get the young ones to grow well.

Does which have been breeding all the summer cannot be expected to continue breeding successfully right through the autumn. They are usually more or less jaded by their exertions in the hot weather, and fall into moult as soon as the cooler season sets in. The best chance of autumn litters is from young bucks and does which have reached the age of 5 or six months in September, and if a buck and several does born between January and June are left running together in a large pen until they show the desire to make a nest (when the nest-maker should be removed to a separate hutch), some litters born between June and December are almost sure to be secured. With older rabbits breeding must be deferred until the moult is completed and the animals are once more in perfect health and condition. Even then a good deal of disappointment will most likely be experienced, for rabbits frequently "miss" in the autumn, even when apparently ready to breed and satisfactorily mated.

BREEDING CONDITION

To have a very small litter is almost as serious a disappointment as to have no litter at all, because just as much time is wasted by the doe in rearing two or three young ones as double or treble this number.

Various factors may influence the size of the litter, but the commonest cause of small litters is undue fatness on the part of either parent. Fat animals are always more or less sterile, and as rabbits over a year old fatten easily (especially if given a dietary too rich in starch or carbohydrates), it is common to find breeding stock of the smaller races partially sterile from this cause after the autumn rest.

The class of condition which leads to large litters is " poor, but improving." The breeding doe should be lean, and should be " flushed " with an additional allowance of concentrated food rich in albuminoids for two or three weeks prior to mating if the best possible results are desired.

Fanciers stimulate backward does by the addition of a few soaked peas to the dietary ; but there is presumably no greater virtue in peas than in any other feeding-stuff with an equivalent proportion of digestible albuminoids, for it is this ingredient in the ration which influences fertility by stimulating without fattening.

NUMBER OF YOUNG

A small litter is almost always the " fault " of the doe. If a buck is fertile at all, he is usually capable at one service of fertilising all the ova (and many more) discharged by the doe. The number of young therefore depends chiefly upon the number of ova discharged by the doe, and this in turn depends upon the physical condition of the doe, and also to a limited extent upon heredity. Some breeds or strains are noted for their fertility ; others are not. Size seems to have a good deal to do with it, for it is rare for the smallest breeds, such as Polish, Himalayans, Silver Greys, and small strains of Havanas, to have more than six at a birth, three to five is more common, whereas the does of breeds over 7 lbs. in weight usually have from five to ten, eight being perhaps a fair average. On the other hand, rabbits of exhibition strains of naturally prolific breeds, such as Flemish Giants, are often very poor breeders, their litters of three or four young apparently being the result of selection over a long series of generations of breeding-stock bred in small litters, the idea being that rabbits born in small litters grow to a larger adult size than the members of a large litter. In view of what has already been said with reference to the hereditary nature of size, the promotion of growth, etc., this view is in the present writer's opinion erroneous, although in practice no doubt bad feeders will do better with stock bred in small litters.

The biggest litter on record up to the present time is 20 young from an animal of Flemish blood, and the same doe was reputed to have previously had two litters of 10 and one of 15 young. Several litters of 15 have been recorded ; also one of 16 and another of 18. At the other end of the scale are litters of three and two, and occasionally only one young one is born. The breeder who could show an annual average of 20 young reared for every doe kept in a large rabbitry would have a record to be very proud of.

That young does do not necessarily have small litters, as the present writer among others at one time thought, is proved by the fact that a young Beveren doe, not 6 months old, had 12, of which 11 were reared, in her first litter, while first litters of 7 and 8 have several times been bred recently from Havanas. In the case of the latter breed, the small, cobby, small-eared type seems to consistently breed smaller litters than the large-eared, big-framed type.

Repeated services by the buck lead to the production of small litters, not the reverse, as many novices think.

Milk-producing Qualities

Darwin states that the wild rabbit has ten teats, whereas the older naturalists (Macgillivray, for instance) give the number as six. The number in domestic rabbits is believed to be variable, but several does in the writer's possession at the time of writing have six, and this is the maximum so far discovered. If it is desired to breed large litters, it is important to choose breeding does which are well furnished in this respect.

The quantity and presumably the quality of the milk given by does is also variable, judging by the difference in the way animals of various breeds and strains kept under similar conditions rear their young. Sometimes, of course, bad rearing is due to bad feeding—*e.g.* to an insufficiency of albuminoids in the ration ; but in other cases it is difficult to account for otherwise than as individual variation on the part of the doe. An improvement in the quality of the food will soon show the feeder where the fault lies, because the milk will obviously increase towards the evening, and the young will begin to grow faster if poorness of dietary was the cause of an indifferent supply.

Milk-producing qualities, in all those animals in which attention has been paid to the subject, have been proved to be inherited through the male ; that is to say, the daughters of a doe which rears her young particularly well will not necessarily do the same unless their sire is bred from a doe with similar characteristics. In other words, it is important to choose as stud buck an animal from a doe which is a good rearer, because he will hand on this characteristic to his daughters—and to get a strain of good rearers this qualification must be carefully selected for on both sides of the family.

Age for Breeding

A rabbit is fit to breed from when it is almost or quite full grown. It is difficult to be more definite, because a good feeder will have rabbits a month or six weeks ahead in development of litter brothers and sisters badly reared. Again, the time of year is a factor in some rabbitries, for although it is possible by using a scientifically calculated ration to grow rabbits almost if not quite as quickly and well in autumn as in spring, yet few breeders seem to have discovered the art, and youngsters born in the late summer are more frequently than not backward (if they survive at all). Well-reared youngsters of the medium-sized varieties, born in January, February, and March, will often breed at $3\frac{1}{2}$ to 4 months old ; whereas others of the same breed, born from June onwards, will seldom breed till five months old.

The smaller varieties usually breed earlier than the large ones, as is only to be expected. It can be taken as a broad rule that the manifestation of the reproductive instinct is an indication that rapid growth has ceased, and there is no serious objection to allowing young rabbits to breed as soon as they will if proper care is taken of them. It is an absolute fallacy to suppose that growth is permanently checked by using a young buck moderately, or by allowing a young doe to rear a litter. If the doe is given a dietary which is properly balanced so as to supply not only her own bodily needs, but those of her young ones as well, she will experience no appreciable check at all; it is the failure to carry out these necessities which leads fanciers to condemn the practice of early breeding from experience. On the young male, as far as can be discovered, reasonable and moderate use has not the slightest effect in any way beyond insuring his future keenness and fertility.

Size of Youngsters

Many breeders declare that the young of immature parents will be below the average in size. If the doe is properly fed, there is no foundation for this belief. Young rabbits usually weigh from 1 oz. to 1½ ozs. at birth, their precise size depending upon the number carried, rather than upon the age of the doe. A doe of any age will have rather small young ones if she has been undernourished during the period of gestation, and as does show their condition of pregnancy very little if at all, it is common to make the mistake of underfeeding them (in quality) during the latter part of the period, when they are carrying a large litter. Old does require less nourishment for their own bodily wants, and therefore usually have a larger surplus for the requirements of the embryos, hence it is a common experience in the average rabbitry to get larger youngsters born from old does than from young ones. But, as already suggested, it is probably more a point of management than physical peculiarity.

Heat or Season

A healthy buck is always ready to mate. A normal doe will only accept service at the more or less regular periods when she is in heat or season. The first period of heat in a doe's life usually occurs soon after her most rapid growth ceases, which may be when only 3½ to 4 months old in the case of well-reared youngsters in the early months of the year, or when 5 to 6 months old in the second half of the year or in the case of youngsters of the most gigantic breeds.

Thereafter the average doe usually comes in season at intervals of every two or three weeks, and remains in this condition 3 or 4 days. It is advisable when letting her miss a period to note the date on the hutch so as to be able to make the calculation and catch her at the right time on a future occasion.

Some does will apparently mate at almost any time. But more often than not their condition is due to a local trouble, and although they may accept service time after time, they will not be likely to prove in kindle unless one of the dates on which they are mated happens to coincide with the date on which they ought to be in heat. During the period of heat, and only then, ova are ripened and discharged ready for fertilisation by the male spermatozoa; at no other time can a service be successful, however willingly accepted. It is therefore important to learn to recognise the most propitious moment for mating a doe, and it is one of the greatest difficulties experienced by beginners.

To those who have studied their does as individuals, a change of demeanour will be evident when they are coming in season. They will become more vivacious and lively, some may show temper, others pluck themselves, some may rub their chins on their troughs like bucks often do, and so forth. The chief thing to attract attention is that a doe does some trifling thing which it is not her usual habit to do. She should then be caught and examined locally for swelling and redness of the external genital organs, and especially for a purplish appearance and distended state of the small blood vessels.

No doe that is low in health, weakened from any cause, or ill-fed comes in season. This state has been described as the "crown of health," and arises at once when the receipts in the way of food outbalance the expenditure in warmth and energy production. Hence a doe usually comes in heat when her litter is between three and four weeks old—in other words, when the youngsters are beginning to be self-supporting and the mother is commencing to make a recovery from the strain of rearing them. If a doe will not breed at this time, she is evidently being underfed. If this period is missed for any reason, she can be mated three weeks later with a good chance of success if she has not become fat in the interval. When a litter has been lost at birth, the doe will usually mate again 7 to 10 days later.

Does will very often appear to be in heat and will accept service three weeks from the date on which they were mated although they are actually in young. No harm or result in any way has come in the writer's experience from such matings, and a litter has sometimes been born a week later and normally reared; but it is not a practice to recommend or allow, for there is a serious risk of abortion or superfœtation, and it is possible for the former to occur without the breeder being aware of anything wrong but the fact that his doe has missed to both services. In normal does this period of excitement three weeks after service is employed in making her nest; it is when she fails to do this that the breeder is tempted to believe that she is not in kindle and mates her again. However, it is safer, unless the owner is certain she has missed, and begrudges the time which will be wasted in giving her the benefit of the doubt (involving a wait of perhaps another three weeks to her next period), to keep a doe away from the buck till her full time is up. Some does which have been mated but are not in kindle make a nest in the normal way and produce no litter.

The spring is the natural breeding-season when all usually goes well; but does will often accept service in the autumn without maturing ova, with the result that no litter is obtained. As fecundity is induced by foods rich in albuminoids, the remedy is obvious.

MATING

When the doe is believed to be in season, she must be conveyed to the buck's hutch. This rule is absolute, for although there are many exceptions, and it is possible to adopt all sorts of unorthodox methods and play all sorts of tricks without ill result with some of the debilitated and phlegmatic English exhibition strains of fancy rabbits, the fact remains that it is doe rabbit nature to resent the introduction of a male into her home, and it is a most dangerous proceeding for the buck to introduce him into the hutch of a doe. Even when correct methods have been adopted, many bucks have been killed by savage does, and now that some of the virile foreign flesh and fur breeds are becoming popular in this country, it is more than ever necessary to warn the novice on this point.

If for any reason the buck's hutch is unsuitable for the purpose, a special mating-hutch, free from obstructions of any sort (a circular pen is a very good shape), should be used. The buck should be put into this hutch half an hour before the doe is introduced. The floor of the hutch at the time of mating should always be clean and clear of straw and debris.

The rabbits must be supervised throughout. A known savage doe, or one which shows the least symptom of spitefulness, should never be let go of, but should be held lightly by the ears (with a stout glove on) to prevent her turning on the buck. Ordinary does generally run a few times round the hutch and then accept service.

A successful mating, therefore, takes place in a very few minutes, and is indicated by the buck depressing the hind-quarters and falling over sideways or backwards, at the same time making a special cry. Some does give a squeal, but most are silent. If the doe persists in eluding the buck, and seems very frightened, she must be removed and tried again next day, and subsequently until success is assured.

As soon as she voluntarily moves after a successful mating the doe should be removed to her own hutch. Unless an examination of the floor reveals that the service has been unsatisfactory she will have the biggest litter of which she is capable from the one mating. If, however, there is any doubt, the doe should be brought back in about half an hour and another service allowed. Not only are the energies of the buck wasted, but it is absolutely unfavourable to the production of big litters to allow more than one successful mating. Rabbits should not be mated just after a heavy meal. One of the best times is probably in the evening prior to the evening meal.

Number of Does

It is usual to allow one buck to every ten does, but in a stud comprising this number it is advisable to keep an understudy for use when several litters are desired almost at the same time. A vigorous buck is capable of about fifty services in the year, or an average of, say, two per week. In the spring he can no doubt be used more than once on the same day, or on several consecutive days quite successfully if well fed, stimulated with oats, and given adequate rest before and after. Excessive use will, however, be likely to bring his procreative powers to an end earlier in life than will be the case if his powers are more carefully conserved.

AGE OF BREEDING STOCK

The natural duration of life of a rabbit is generally given as seven or eight years, and most animals will breed freely if their powers are not abused until five or six years of age or even longer. French authors consider that it pays best to use young breeding stock, taking two or three litters from a young doe and then selling her out at about 18 months old while in her prime and worth a maximum price. Other breeders pin their faith to well-tried friends which serve them faithfully for years. The point is one which each owner must decide for himself. The present writer is in favour of using young stock, as only by the selection of the best of each season's breeding can a stud be progressively improved. Bucks can be used occasionally from five months of age, but should not be put into full use until at least nine months old.

NUMBER OF LITTERS

Wonderful estimates are given of the number of litters which may be expected from a doe in twelve months, the most reasonable being four, while the optimistic rather than practical computation rises to six. As a matter of fact, in practice three litters is as much as most does can get comfortably in if they rear them well, and are given time to recuperate. A certain French scientific writer mentions this number as the normal or usual one for a rabbit in a year, which is probably near the truth. A fourth litter can, of course, be secured if any mishap occurs which prevents the full rearing of one of them. This matter, again, is one which must be left to the breeder's discretion, because much depends upon how the animals are fed, the number of young reared, the breed, the age of the mother, and so forth. As in the case of the buck, a doe is likely to prove a useful breeder for a longer series of years if not prematurely worn out by perpetual reproduction.

It is easy enough to get litters during the proper season ; but much stimulation with good feeding, cosy housing, etc., may be necessary to secure fertility in both sexes during the inclement period of the year.

Control of Sex

According to a French author, about five hundred theories have been advanced up to the present time with reference to the determination of sex. It is obvious, therefore, that it is a problem which has not yet been solved. It is highly probable that it never will be, for it is possibly a matter which is not within the complete control of the breeder.

It may be taken as a broad rule that the natural tendency is for approximately equal numbers of each sex to be born, with a slight preponderance in favour of males. When dealing with the subject in detail, it will usually be found that when a sufficiently large number of statistics are collected, an equilibrium or equality between the sexes is arrived at by : (1) litters with an equal number of each sex, (2) litters with a preponderance of males, (3) litters with a preponderance of females. It can be safely predicted that a " run " of male births in a rabbitry will sooner or later be followed by a " run " of female births if the breeder has the perseverance to continue the matings. It is often found in practice that crossing seems temporarily to lead to a predominance of male births, while inbreeding leads to the opposite result. Breeds or strains which are dying out are sometimes thought to throw a great preponderance of females ; but no one has ever yet discovered —though many have thought or said they have—a sure way of controlling sex. In all those instances when a " run " of one sex has occurred, as the supposed result of a certain system of management, continued breeding on similar lines has ultimately led to " autoregulation," or, in other words, to a return to the natural equality.

FALLACIES

Breeders of rabbits, no less than breeders of other animals, contain among their numbers a few individuals more ignorant or credulous than the majority, who place faith in theories which have long ago been proved by scientific experiment to have no foundation in fact.

Many of us have heard of the breeder who painted the insides of his hutches blue in the belief that his breeding stock would be so favourably impressed that they would produce young of this colour ! An even greater number of persons are firmly convinced that if a mutilated rabbit, say one without ears, is kept within sight of a normal doe, she will probably give birth to young with a similar malformation. Mental impression, as it is called, need not be seriously considered ; it never has and never can be a factor in breeding, and those who think otherwise are putting their faith in a phenomenon which has not yet occurred from the cause to which it is attributed. Heredity and variation will account for all the abnormal youngsters which appear.

Again, many breeders firmly believe that if a doe of a pure breed is mated to a buck of another variety, she is spoilt for the further pure breeding of her own sort. This is known as the influence of a previous sire. Others consider that the *first* sire to which a young doe is mated will influence all her future progeny. Many experiments have been carried out scientifically to try to induce this supposed influence, with entirely negative results, and the conclusion reached is that if such a thing can occur, it does so at such rare intervals that it is not a matter which need be taken into consideration by the practical breeder.

A still more absurd idea, which is prevalent among some classes, is that which recently attributed some black youngsters in a cross-bred Silver Grey-Flemish litter to the fact that the buck had been previously mated with a black and white Dutch doe !

Modern discoveries in connection with heredity have accounted for most of the common phenomena experienced by breeders, and we can now foretell with a fair amount of accuracy what to expect when a given mating is made.

SIMPLE RULES OF BREEDING

Breeding to type—the production of animals to a definite standard—has been much simplified of recent years by added knowledge of heredity, and it is now possible in many varieties to reduce the number of wasters bred to a very low figure. Breeders complicate matters for themselves by using " breeding stock "—this term apparently embracing those individuals which are far from approaching the standard desired.

The animals selected for breeding must be in perfect health and condition.

Selection for rapid growth, good health, and strong constitution must be carried out in each generation in addition to selection for more obvious points.

When this is done, the actual relationship of the animals mated is a matter of comparatively small importance.

Relationship can therefore be ignored, and individuals which excel in the points desired should be mated together.

From their progeny individuals should be chosen which possess the same desirable characteristics as their parents; and from them thenceforth a true-breeding strain can be established by careful selection of the best individuals in each generation.

There is very little mystery or serious difficulty in breeding flesh and fur breeds provided the breeder has the power of selection and the strength of mind to discard faulty and second-rate specimens. Animals as a rule reproduce their parent's characteristics with fidelity, and if the right material is always used the right stock will be bred.

GESTATION

The period of gestation is thirty-one days with very little variation. Cases are on record of does which are reputed to have gone thirty-six days; but marked variation either way is unusual.

CARE OF THE BREEDING DOE

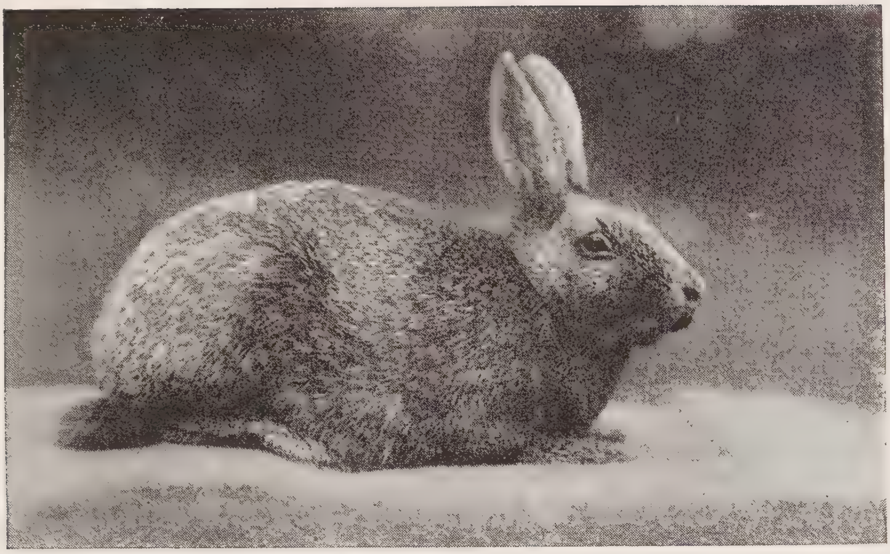
If the hutch is not already equipped with it, a nest box should be furnished to the doe within a few days of the mating. Into this the breeder should put some hay about a fortnight before the litter is expected. Many, indeed most does will carry hay into the empty nest box for themselves ; but as individuals sometimes fail to do this or leave it until the last moment, it is as well to encourage their nest-making propensities by setting an example. The owner will be able to observe when the doe forms his rough bundle into a nest, as she will make it into some semblance of a hole or circle, and will probably nibble some of the long stuff into short lengths.

The nest is usually made between the fourteenth and twenty-fifth day from mating, and there should at this period always be a good supply of hay in the hutch for the doe to use if she wishes. Many litters are lost annually through the doe having no material at the moment when instinct prompts her to make a nest. A good nest in which the doe takes an interest and perhaps reorganises daily, is a promising sign for the future welfare of the litter. Once the nest is made, the owner should leave the nest box or compartment absolutely undisturbed so that the doe may gain confidence, and feel that privacy is secured. A wild doe frequently makes her nest in an isolated " stop " or burrow quite away from the proximity of other members of her species, and a number of the mishaps which occur in fanciers' rabbitries are no doubt partly due to insufficient isolation.

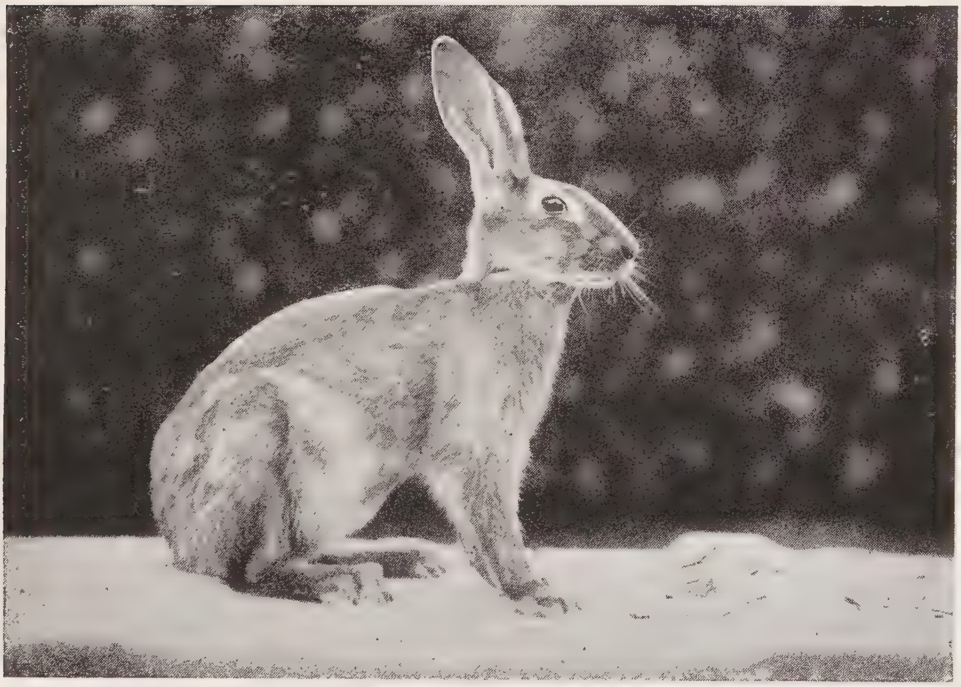
During the first half of the period of gestation the doe should receive the same treatment to which she has been accustomed ; during the last two weeks her dietary should be gradually improved in quality by an increase of the concentrated food so that the animal may obtain additional nourishment without added bulk. The normal quantity of roots given in winter should not be increased ; but in summer as much grass and mixed green food as the doe cares to eat should be supplied.

Parturition

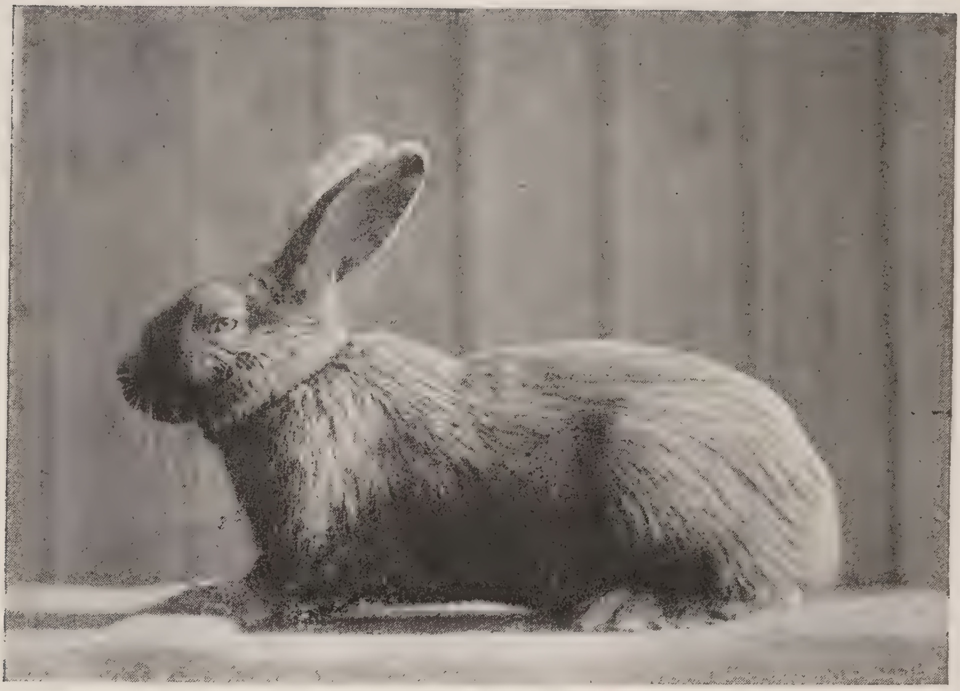
As stated earlier in this book, rabbits require water, at times drink a great deal, and should always be supplied with it. Experience has shown breeders who do not usually use it the absolute necessity of giving water at the time the doe is expected to litter. The salinity of the cleansings, the



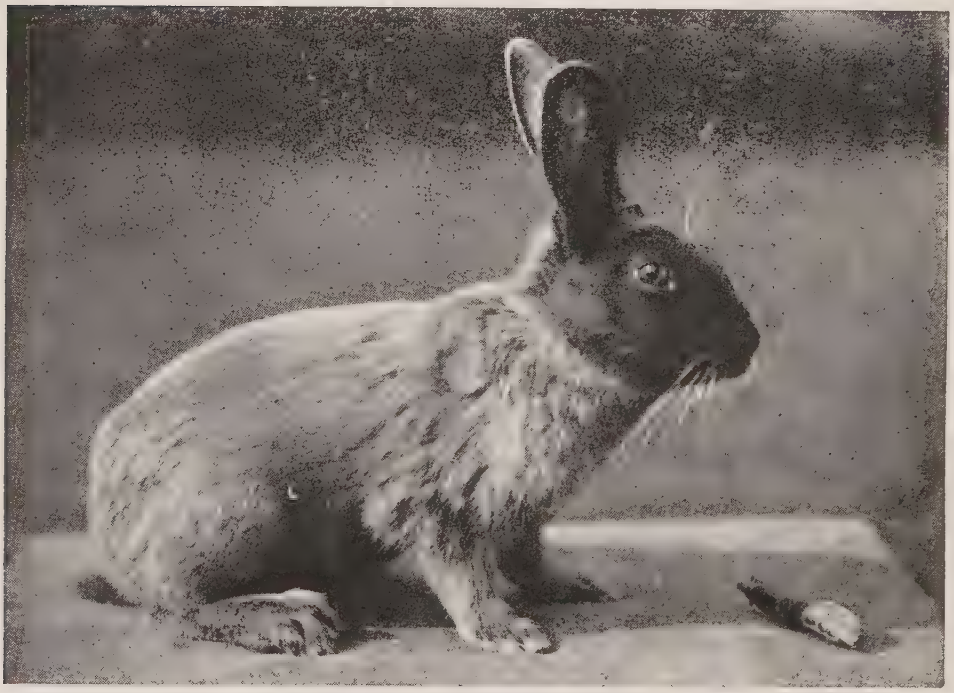
PEDIGREE SILVER GREY.



YOUNG PEDIGREE BELGIAN HARE DOE.



IMPORTED BLUE BEVEREN BUCK—"BLUE JOHN."
(*Giant type.*)



BLUE BEVEREN DOE.
(*Brabançon type.*)

dryness caused by mouthing fur and hay, as well as the energy and excitement displayed, cause great thirst, which if unsatisfied may end in the destruction and eating of the young. About twelve hours before the litter arrives the flanks of the doe become hollow and she markedly decreases in size.

The rabbitry must be kept very quiet at the time a litter is expected ; but this does not mean that the usual cleaning out is to be neglected. The doe will not mind any daily procedure to which she is accustomed ; but dogs, noisy children, and strange people should be kept from her vicinity. When once the doe retires to her nest, every precaution should be taken to avoid sudden disturbance or cause of alarm. As a general rule, if all goes well the naked, blind, and deaf young will be born at intervals of a few minutes ; the doe will lick them and place them together in the centre of the nest, finally covering them over with fur torn from her sides and belly. Tufts of fur about the hutch afford evidence that the litter has arrived. A hand surreptitiously placed over the nest without touching it will feel the warmth of the youngsters if all has gone well with them.

A doe is said to suckle her offspring twice in the twenty-four hours, in the evening between 6 and 8 p.m., and in the early morning about 12 hours later, and at these times the rabbitry should not be disturbed. The young become very tightly attached to the teats, and are liable to be dragged out if the doe is suddenly alarmed and rushes out. As youngsters lying on the hutch floor perish of cold in a very short time during the first few days of their existence, and as a doe never apparently replaces them in the nest, it is not uncommon to have a proportion of losses from this cause in a rabbitry which is subject to disturbance, or in the case of particularly nervous and excitable does. Sometimes apparently dead youngsters will revive if held near a fire for a period not exceeding half an hour, and they can then be put back in the nest ; but if they are stiff when found, the case is hopeless.

With reference to an examination of the nest, this must be left to the discretion of the owner. Some does do not appear to mind at all ; others show by their anxiety that they are likely to resent any interference. A fairly quiet doe used to being handled can be temporarily removed and given some tempting food elsewhere while her owner examines the nest, using a stick to open it with, or else first rubbing the hands with soil or herbs. On the other hand, in the case of does of excitable and bad-tempered breeds, or nervous individuals unused to being handled, it would be very injudicious to try to catch and remove the animal, and far better to trust to luck and leave the nest alone. Young ones born dead are usually placed in the hutch by the doe, but this is not invariably the case, and an eye must be kept open for dead youngsters hidden in the litter of the nest.

If a transference of young is to be made, the doe will have to be removed while the little strangers are placed and well mixed with her own young. A scent of herbs on the hand or any slight odour which will temporarily permeate the nest is sufficient to prevent the doe from resenting the imposition. At birth and soon after young rabbits lie quiet when examined ; but in a day or two when the opening of the nest suggests the presence of their mother and nourishment, they wriggle and squeak when disturbed, and this upsets some does very much if within hearing. Therefore it is as well in most cases to make an examination or transference within the first twenty-four hours, deferring the second look until the rabbits are about ten days or a fortnight old.

Care of the Young

Young rabbits during the first fortnight suffer from extremes of temperature. Those born in winter usually thrive well in a good nest box with plenty of hay ; but in very hot weather youngsters cease to grow if kept too heavily covered with fur and provided with insufficient ventilation. Some does move their young and open up the nest themselves in a heat wave ; if they do not do so, and the little rabbits are found sprawling about, the owner should open the lid of the nest box during the greatest heat of the day and endeavour to keep the rabbitry cooler. Many does try to stop the entrance to the nest box with debris scraped up from the hutch floor, and for this reason there should always be a good ledge to prevent too much of the sawdust, etc., being scraped in and overwhelming the youngsters.

The young rabbits will be covered with wool or undercoat by the fifth day, and by the ninth the hair will have come through. By the eleventh day the eyes will be open, and on the twelfth day it is not uncommon for the youngsters of very bold and precocious breeds, such as Giant Beverens, to begin to come out of the nest. Most varieties are well out by the fifteenth day—although their egress may be surreptitious and they may not be seen unless specially watched for.

The nest box should be cleaned out when the young are 3 to 4 weeks old and well on their legs ; and it will require to be kept clean thereafter. The hutch must, of course, be cleaned out daily. An increasingly great strain falls on the mother from the time the young are born until they are about 4 weeks old and begin to eat an appreciable amount of food. The dietary of the doe must therefore be gradually improved in quality and increased in amount from within a day or two of the birth of the young. The albuminoids are the milk-makers, and a narrow albuminoid ratio is what is required. The young rabbits will share the food and drinking water of their mother, which, if it is keeping her in good health and condition, will suit them equally well.

Does which belong to breeds which fatten easily, such as Havanas, maintain their condition while suckling much better than the Giant breeds ; indeed, if the litter is small and the albuminoids overdone, milk troubles may ensue. Flemish Giants have a bad reputation for losing flesh at this time ; but it is probably often in part due simply to insufficient nourishment, for many breeders seem to fail to realise what very great quantities of food these large rabbits require. Allowing for the relatively poor digestions of some of the big races, there is no reason why a clever feeder should not be able to maintain his does in fair condition when they are rearing large litters.

CHAPTER XII

REARING

CHARACTERISTICS OF YOUNG RABBITS

THE first coat of young Silver Greys is black, the "silvering" commencing on the nose at 4 or 5 weeks old, continuing on the chest, belly, and feet, and finally finishing on the back with the completion of the first moult at 5 or 6 months old. Young silver fawns are self fawn, and silver gradually in the same way; and silver browns are like wild rabbits until the silvering appears.

Young Himalayans and White Beverens are pure white until 5 or 6 weeks old, the coloured "points" (nose, ears, feet, and tail) gradually coming through and intensifying until they are at their best when the rabbits are 5 or 6 months old.

Young black and tans change much as the moult proceeds, and it is in the opinion of expert breeders never safe to discard those that are thought to be imperfectly marked until they are at least 3 months old.

Young Havanas become darker in the second coat, and individuals occasionally become darker still when they moult again at between 5 and 6 months old. Blue rabbits vary very little if at all in shade of nest fur and adult coat. Young albinos, such as Polish, are usually more delicate and subject to diarrhœa than breeds which are wholly or partially pigmented, colour in all animals being found combined with increased constitutional vigour.

Young Angoras require brushing or combing at least once a week from the time they are 6 weeks old, otherwise knots of hair, impossible to disentangle until the next moult, will form.

All bicoloured breeds, such as Dutch, English, Black and Tans, etc., are liable to throw occasional self-coloured youngsters; as also are Flemish Giants and Belgian Hares;

while self breeds, such as Blue Beverens, Havanas, etc., sometimes throw offspring with white noses or tips to forefeet, or coats liberally sprinkled with white hairs. A serious fault in Blue Beverens is rusty stains or patches which sometimes come with the adult coat. They also occasionally throw self white or fawn-coloured young.

WEANING

Young rabbits can be weaned at from 5 to 6 weeks old in the spring when the weather is warm and the grass abundant and good, and not earlier than 8 weeks old from August onwards. The digestions of young rabbits are too feeble at 4 weeks old for it to be desirable to remove them from their mother's care at this early age, and if for any reason it *has* to be done, their food should be supplemented for some weeks with a teaspoonful per head once daily of some such food as " Lactol " added to the concentrated food.

Many young rabbits are lost annually from a too early weaning. Growing youngsters are extremely susceptible to parasitical invasion ; the least check may cause disease of this nature to occur ; and it is highly important to leave the youngsters with their mother till an age when they are strong enough to receive no check or feel the change. For how long a doe naturally suckles her young it is difficult to say. Young ones left by the present writer experimentally were still sucking the doe at 4 months old when they were almost as large as their dam ; but it was not considered that any advantage was gained by leaving them thus long, as they were not above the average in weight or superior in any way to those taken away at the usual time.

Breeders who use very small hutches are tempted to take the young away early because the hutches become overcrowded. It is obvious therefore that indirectly as well as directly small hutches may lead to loss and are to be condemned by the practical breeder. Hutches should be of such a size that they will comfortably accommodate the doe and the average number of young which is to be expected.

REARING PENS

The rearing pens (already described) should be spacious, well-protected from the weather, and kept scrupulously clean by a daily cleaning out. Not more than ten youngsters should be reared together, and these should preferably be of the same sex. It is a safe plan to put into the same pen all youngsters below 3 months of age born during the same month.

If the pens are made up at first of mixed sexes, the young must be separated at 3 months old, for many well-reared and precocious specimens will breed when from 3½ to 4 months old.

The more space for exercise the young rabbits have, the healthier they will be, and their rate of growth and general development will be greatly influenced by the accommodation provided for them. Given space and an adequate amount of a correctly balanced ration, and there should be very little difficulty in rearing them at any time of year.

The dietary should consist of hay, roots (or their equivalent), and concentrated food. In summer grass always in the racks ; additional green food, such as garden refuse, etc., given morning and evening if required. Concentrated food once daily. In winter hay always in the racks, the root allowance divided into two meals. Double the summer allowance of concentrated food given in two meals. Water to drink always.

In this way the young rabbits will be fed twice daily with a variety of food, and they will have grass or hay always in the racks to pick at between the principal feeding times. Provided the various foods are in a sound, wholesome, clean, and unfermented condition, the young rabbits should be absolutely free from digestive troubles, and should make the greatest growth possible.

Many breeders fail to rear young rabbits in the late summer and autumn. The animals generally become diseased and die ; but the primary cause is usually incorrect feeding. A breeder rears successfully on greenstuff and bran in the spring, and is surprised that his youngsters die off on a similar dietary in September. The reason will be obvious to those who have read the preceding chapter on the Principles of Feeding. Although the actual cause of the death of the young rabbits may be a parasite which has invaded the liver, intestines, or some other part, the parasite would probably not be there if the rabbits had been properly fed. The owner would no doubt be shocked and offended if told that the chief cause of the death of his rabbits was starvation ; yet this statement would not be far off the truth. Young animals can suffer from a slow and insidious form of starvation in the midst of abundance if the food they are receiving does not supply their needs, and in this state they are open to the attack of any parasite which comes their way. Young rabbits which are deprived of the albuminoids they require, in addition to being thin and attenuated, seem to show on a post-mortem examination (when free from parasitical disease) a strange transparency of the intestines, which become so weakened and unable to " work " that the unfortunate rabbits die from " fits " the first time a little extra strain is put upon their digestive powers.

When young rabbits are fed in a correct manner, which keeps them thriving, there is very little fear of parasites, for these do not seem able to obtain a foothold at all easily in any but debilitated frames. A lump of rock salt kept in the food trough will also help to keep young rabbits free from parasites.

To prove that youngsters born in August and reared on the Morant system during a cold and wet autumn on grass which had carried rabbits all the summer can, if properly fed, grow as fast and do as well as those born in June, the following table of weekly growths is given. For the sake of brevity the weight of one rabbit only in each litter is given ; but every member of each litter grew equally well.

TABLE TO SHOW GROWTH OF RABBITS REARED IN SUMMER AND AUTUMN

—	Age in Weeks.							
	5	6	7	8	9	10	11	12
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Havana doe (small type) one of litter of 4 born early in June, 1917 .	1 5½	1 10	1 15	2 2	2 2	2 7	2 7	2 13
Havana buck (smalltype) one of litter of 7 born late in August, 1917 .	1 2	1 8	1 12	2 1	2 2	2 6	2 12	3 0

The cost of rearing the autumn rabbits was almost double that of those born earlier in the year, because an increased amount of concentrated food (amounting to about double, given in two meals) was used. The cost was not a very serious item, however, because in no case did the rabbits receive as much as 3 ozs. per head daily of a mixture costing rather over 2*d*. per lb.

CASTRATION

The French recommend this operation more especially in the case of Champagne Silvers and other fur breeds which have to be run on until at least 6 months old. As a small proportion of losses will probably follow the operation, it is not likely to pay in the case of common table rabbits. If young bucks are kept from the age of 3 months upwards in large pens quite out of sight, smell, and hearing of does, they will usually live amicably together in their natural state until killed for flesh or fur. There is no doubt, however, that they are easier to manage, fatten more readily, and are less liable to sustain damage to their coats when castrated.

The operation is carried out as soon as the testicles have descended, and this may occur at 3 months old in spring-born precocious youngsters, or not until 4 or 5 months old in those born late in the year or in specimens of the slow-maturing breeds. In any case, the earlier the operation is performed, the better is the quality of the flesh reputed to be.

An assistant is required to hold the rabbit on his knees on its back with the hindlegs drawn forward towards the head and tightly held. With a surgical knife (bistoury) one cut is made across the skin covering each testicle, they are then drawn out with pincers, a ligature is tied round the cord as close to the body as possible, and the testicles are detached in front of it. The wound is washed with disinfectant and the animal returned to a clean hutch. Some operators do not trouble to tie a ligature, but merely cut the cord with scissors and dress the wound with antiseptic ointment; and this is a method which commends itself to many experienced veterinary surgeons in the case of other animals.

In whatever way the operation is performed (and the breeder will be well advised to take a lesson from a veterinary surgeon or practise on a dead rabbit first), it is advisable to fast the animal for some hours prior to the operation, to choose weather which is neither excessively hot nor cold, and to feed lightly for several days following, until a return has been made gradually to the regular dietary. The hutch must be kept scrupulously clean, and if all has gone well, the rabbits will have recovered perfectly in about three days.

HANDLING YOUNG RABBITS

Young rabbits which are to be sold for stock purposes, exhibited, etc., should be gently handled occasionally by picking them up by the loose skin behind the shoulders, stroking them, and so on, from the time they first leave the nest, so that they may learn not to kick and bite and resent interference. All rabbits naturally dislike being handled and are awkward animals to hold, and it is only constant training which makes most prize rabbits so docile.

SEXING RABBITS

A fair idea can be gained of the sexes in a litter which has not been often examined if on the fourteenth day the nest is opened. All the rabbits which first raise their heads will probably be bucks, while the does will remain crouching longer.

To sex rabbits at 3 weeks old is often difficult to the novice. At 5 weeks old there should be no great difficulty if each youngster is caught, held in the hands on its back, while with the thumb of one hand the parts are opened out and pressure applied to force out the organ of the male. Even at 5 weeks old, however, there are occasional doubtful cases, due to a small membrane which sometimes keeps back the male organ, and it is desirable when selling young rabbits of a definite sex for even the most experienced breeder to examine the animals once again before allowing them to leave his possession. Nothing causes more annoyance to a purchaser than to find, perhaps long afterwards, that a mistake of this nature has been made.

COST OF REARING

In summer young rabbits can be reared very cheaply if plenty of grass is available. The chief item of expense is the concentrated food, which in ordinary times should be procurable at about one penny per pound. It has been found by the present writer that young rabbits of medium-sized breeds require as a minimum, roughly: 5 lbs. per head of a mixture containing between 15% and 20% of albuminoids, from 3 weeks to 18 weeks of age in summer, divided into: ½ lb. between 3 and 6 weeks old; 2 lbs. between 6 and 12 weeks; 2½ lbs. between 12 and 18 weeks.

The actual cost of producing a rabbit fit to put on the table in summer is therefore largely under the control of the feeder, and depends upon a judicious choice of an adequate and cheap food.

The French used to estimate that the cost of the summer feeding of table rabbits with foodstuffs at ordinary prices worked out to 10½*d.* per head, divided into 1½*d.* per head for the 6 weeks the youngsters were with the doe, and 9*d.* per head from 6 weeks to 4½ months old when they were fat enough to kill. In winter the cost was increased to about 1/4 per head.

DROPPED EARS

If exposed to great heat, one or both of the ears of young rabbits are apt to "lop" or fall down, and if this occurs from the roots they never recover, and are therefore spoilt for exhibition. Protection from the sun in very hot weather must therefore be afforded; but it is equally important to exclude all heating foods, such as oats, maize, and barley, from the dietary during the warmer periods of the year, as their use seems to predispose the youngsters to this trouble.

TOTAL FOOD EATEN BY YOUNG RABBITS

The following table gives the total food eaten by (eight) young rabbits which were fed experimentally for 6 weeks. The rabbits were divided into pairs, and each brace received:

Daily Ration of each Brace.	Age of Rabbits in Weeks.						Total Food consumed by Two Rabbits in 6 Weeks.
	6	7	8	9	10	11	
	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.	lbs. ozs.
Concentrated food	0 1	0 1	0 1	0 1½	0 2	0 2	3 11½
Clover hay .	0 1	0 1	0 1	0 1	0 1	0 1	2 10
Grass and green-stuff . .	0 10	0 14	1 0	1 0	1 0	1 0	38 8

The rabbits were small ones, weighing about 1 lb. each at the beginning of the experiment, and they added from about 1 lb. to 1¾ lbs. in weight during the period of feeding. The experiment was carried out in summer, and the quantities represent what is considered to be a minimum of food for the time of year.

CHAPTER XIII

BUYING, SELLING, AND EXHIBITING RABBITS

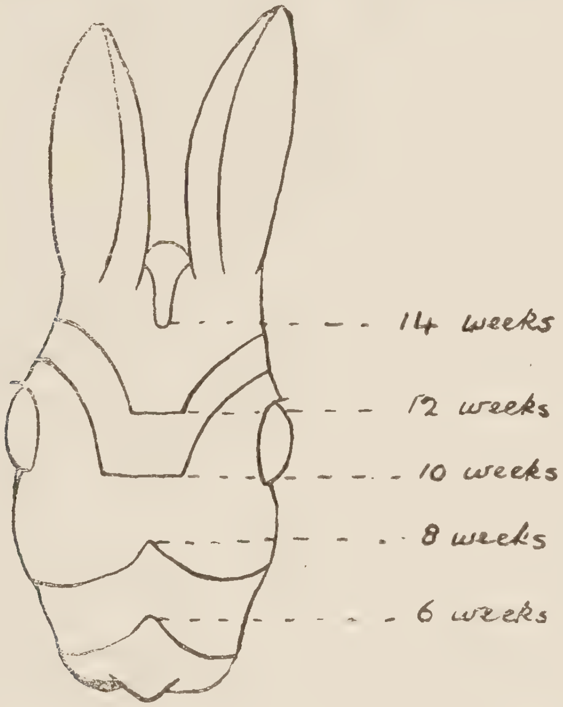
To Tell the Age

It is not easy to tell the age of rabbits once they are full grown, for the length of the claws depends so much upon the nature of the hutch floor, that as a guide it is quite unreliable. Rabbits kept in Morant hutches usually keep their claws short through jumping on and off the shelves ; indeed, on anything but a thick straw bed it is not invariably the case that the long, curved nails betokening an age of more than two years are evident. The French profess to be able to distinguish youth from age by feeling with the nail of the thumb the joint or " wrist " of the foreleg. The further apart the heads of the two bones which help to form the articulation are found to be, the younger is the rabbit ; but it must be confessed that the present writer has not yet found this method either practical to apply to all breeds or satisfactory.

The claws of the forefeet are smooth and sharp, and do not extend beyond the fur in an animal of less than a year old ; at eighteen months old they are usually well beyond the fur and are beginning to get a decided curve. Many old rabbits get a sunken eye and a generally " old-fashioned " appearance difficult to describe, but which will be recognised with experience, and this, combined with dry tough ears, coarse blunt nails, and a dewlap in some breeds, will suggest antiquity.

In the case of breeds of rabbits in which great size is an important point, a common fraud with regard to the age of youngsters is practised by unscrupulous breeders. A youngster which is 6 weeks old (*and* several weeks more) is offered as 6 weeks old (which it certainly *is*), and the weight given seems an excellent one for a rabbit of this age although poor enough for a creature several weeks older.

It is not difficult to tell the approximate age of a young rabbit of any breed to within a week by the pattern formed on its head as the moult of the "baby" coat progresses. It is easier to see in coats of some colours than in others; in young Havanas, for instance, in which the new coat is much richer and darker than the old, the pattern is obvious for every one to see at a glance. In white or in black rabbits, and in the wild coloured varieties, it may be necessary to get the animal in a certain light so that the division between the shiny new coat and the duller and longer nest fur is apparent. The following diagram, drawn from specimens bred by the writer of which the exact age was known, has been tested and found to apply to young rabbits of several breeds, and will, it is hoped, afford a guide to purchasers of the approximate age of young rabbits.



BUYING

The usual method of buying rabbits is to consult the advertisement columns of the fancy press and get into correspondence with the advertiser whose stock sound suitable. All reputable papers have a Deposit System—*e.g.* lay themselves out to hold the money while negotiations are proceeding between buyer and seller—and the novice is advised *always* to make use of this system when dealing with strangers, even though it gives a little extra trouble.

Once the money is deposited, the stock is sent "on approval" automatically, and can be returned carriage paid within three days if unsatisfactory.

Failing a deposit, the buyer should ask for the stock to be sent "on approval," which is a thing breeders are sometimes willing to do without security. In any case the buyer should never send money to a total stranger before he receives the stock—and as it is equally inadvisable for the seller to send the stock before he receives the money, the obvious and only solution is the Deposit System.

Apart from the characteristics of the animal as a good or bad specimen of its breed, buyers should study their proposed purchases for (1) good general health, as indicated by a bright eye, lively demeanour after a few hours' rest, and glossy coat, (2) should examine the interior of the ears for signs of canker and the nostrils for the slightest suspicion of moisture or a more severe discharge indicative of a cold or Snuffles, (3) the reproductive organs for scabs or inflammation, (4) and the outsides of the ears, nose, and feet for scabs of mange or ringworm, and reject a rabbit with any of these troubles because although a complaint, such as canker of the ear, is not difficult to cure if the right remedy is used, and a good rabbit with it might be worth buying *at a price*, yet it is not fair dealing to send stock to novices with infectious diseases and expect to receive the price of sound rabbits for them, while the attempted cure involves expense, trouble, and risk of infection.

SELLING

Pure-bred and good class stock is usually offered by advertising it, and the skill displayed in writing an attractive advertisement will greatly influence the result. Novices are advised to give particulars of age, weight in those breeds where size is of importance, prizes won, and, above all, price, because buyers will seldom take the trouble to inquire the price of ordinary stock offered, and its omission also leaves the reader with an uncomfortable feeling that perhaps the price asked may vary with the supposed status of the inquirer.

The remarks already made on the subject of approval and the Deposit System apply here. Copies of all letters written should be kept, also all communications received, until a transaction is concluded.

It is customary to send stock which is sold in a non-returnable box of a suitable size purchased from the grocer. Ventilation should be provided by nailing strips of wood about an inch apart across the top in place of the lid. The label should be tacked on with five small tintacks short enough for the business ends not to come through the wood, and a piece of string or rope should be passed round and across the box to keep it together and handle it by. It is advisable to have " Live stock " in large red letters tacked or pasted on the box.

Stock south of London or Bristol should be despatched for the North in the morning, and may then be expected to reach its destination early next day; and vice versa. In other words, it must usually be reckoned that it is a twenty-four hour journey from one place to another if London or any other great terminus intervenes.

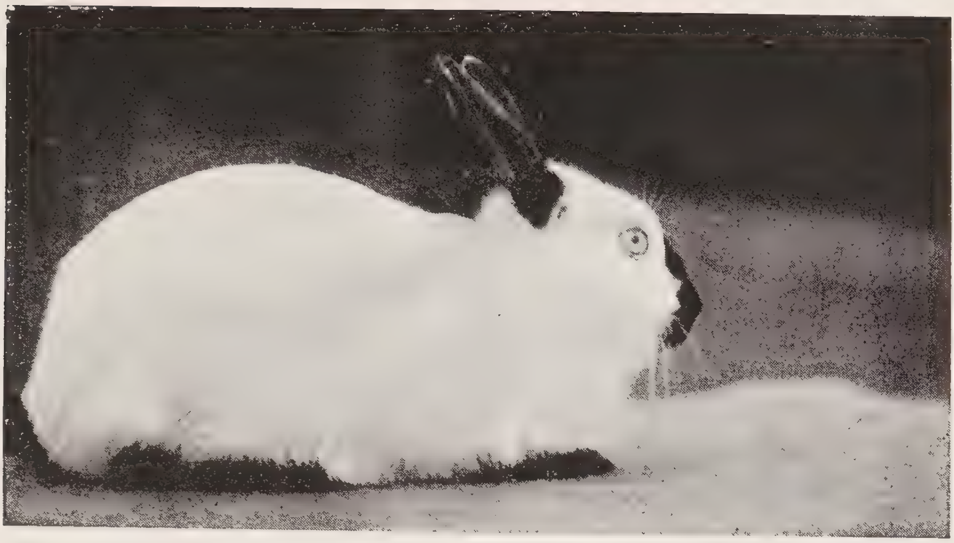
When selling rabbits, or indeed any sort of pure-bred animal, a relatively much higher price can usually be obtained for youngsters at weaning time or soon after than later in life. Buyers are always ready to speculate in young stock on the chance of picking up something which " grows into money." A long experience has convinced the present writer that it is far the most profitable plan to sell young rabbits as early as possible if opportunity occurs of obtaining a fair price. The risks of rearing are very great, and many animals develop some fault of conformation or colour with the second or third coat which makes them worth very little if any more as adults than could perhaps have been obtained weeks or months earlier before food and labour had been wasted on them. On the other hand, in the case of those breeds which alter considerably as age advances, it may be argued that the chance of parting with something that turns out really good is too likely to make the selling of youngsters in the nest fur permissible. If the whole future success of the stud depends upon the exhibition of prize-winners, this argument may apply; but with ordinary, good, pure-bred stock the pleasure given to the buyer whose purchase turns out well, and his consequent recommendation of the stud, will probably do more for the breeder in the end than the few extra shillings he might have made more directly. It is highly probable that the value of well-bred youngsters will average out to about an equal amount in practice at whatever age they are sold, and it will most likely pay better when the risk, labour, and cost of rearing are taken into consideration to sell a litter of six for 30/– at weaning time, than to get varying prices, totalling very little if any more, when those which have survived are 6 months old.

It is a good maxim in animal transactions to " Never refuse a profit." Again, " Small profits, quick returns," will pay most breeders better than big prices at long intervals. One might go further and say, " Never refuse a good offer," for it is a common experience with most of us to have no further luck with stock for which we have declined a fair price. It will also frequently be found that if a bargain is not clinched at once, the opportunity of a sale is lost for ever. Therefore all breeders are advised to " Keep on selling " if they desire to have a comfortable balance on the right side of the ledger.

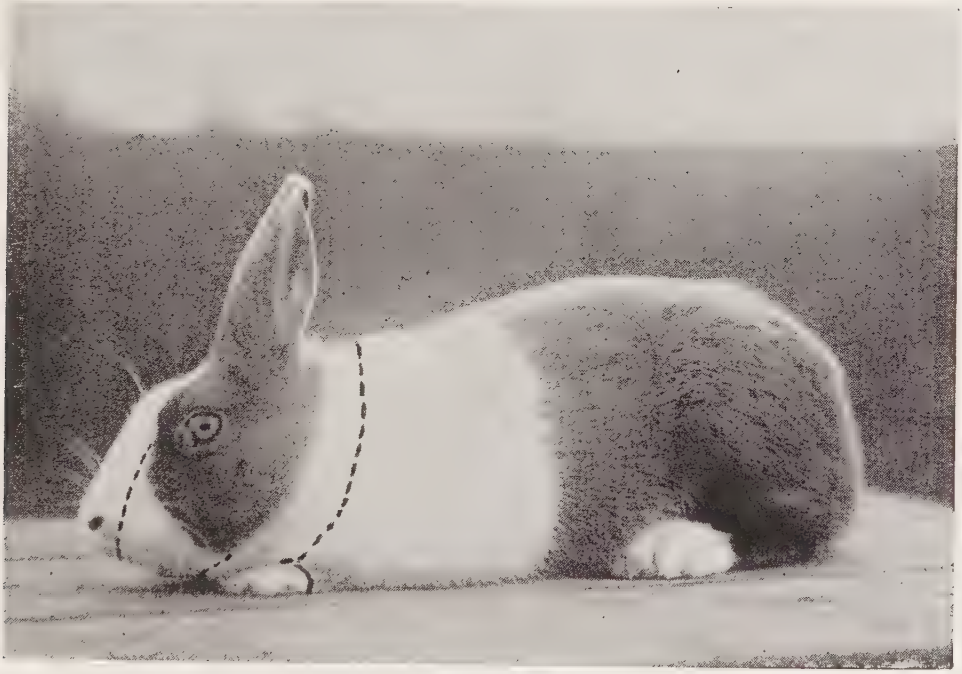
There is usually a good demand for healthy pure-bred rabbits offered at reasonable prices, and a seller who earns a reputation for reliability will seldom lack customers. It is always better to sacrifice a doubtful animal than to save a few shillings by passing it on, for nothing will do a stud more harm than dissatisfied customers. The value of animals can generally be estimated by a study of the advertisements in the fancy press. Some breeds are always " cheap " ; others bring an altogether higher range of prices. When estimating the individual value of animals which have never been exhibited, it is better to err on the side of giving the purchaser a bargain than to charge too much, for the novice buyer is certain sooner or later to find out the true value, and will form an opinion of the seller in accordance with his discoveries.

Exhibiting

Among novices there is often an idea that exhibiting is a difficult business, and that without a knowledge of the

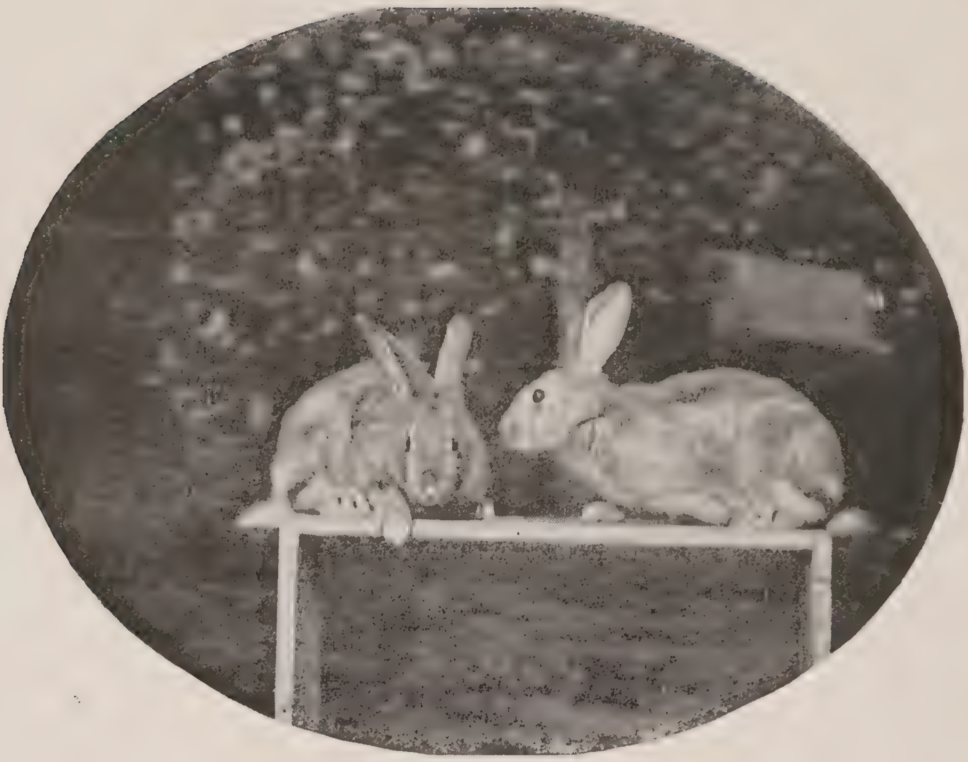


HIMALAYAN DOE.

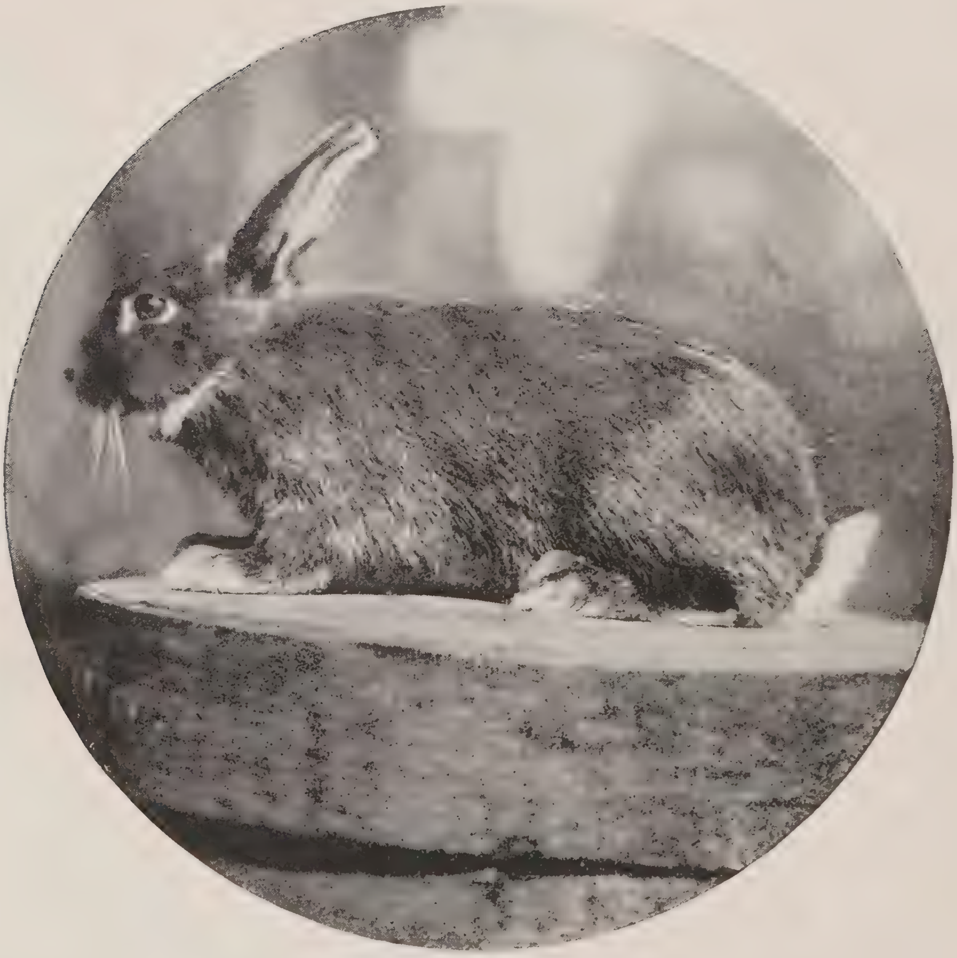


DUTCH BUCK.

(*The dotted lines show the markings of the Brabançon rabbit which are not considered to seriously affect the value of the pelt.*)



HALF-BRED FLEMISH ANGORAS.



PRIZE BLUE AND TAN DOE.

"tricks of the trade" it is impossible to compete successfully. This view is fostered by the mystery with which old fanciers like to surround the subject in order to enhance their supposed skill. With the exception of cleaning the coats of white rabbits if they are dirty with baked flour (1 lb. and 2 ozs. blue added) or fuller's earth, which must be rubbed in and then brushed out, and showing Angoras well brushed (the coat being brushed out so as to make the animal appear as large and as circular as possible, rather than brushed down flat), good condition is show condition. By good condition is meant a rabbit well covered with firm flesh, glossy, and in perfect health. It is hopeless to send a bag of bones, however perfect the animal may be in colour or markings; and none but Flemish Giants should be shown so fat as to be lethargic. An extra gloss on the coat is obtained by adding half to one teaspoonful of whole linseed to the concentrated food daily for two or three weeks before the show; or using linseed cake or boiled linseed, or even a few drops of linseed oil bought from the chemist. (See Linseed, Chapter X.) Whole linseed usually does all that is required; but in a large rabbitry where many specimens are being got up for show, concentrated food composed of ground linseed cake mixed with equal parts of bran or sharps would probably be the cheapest way of using this ingredient.

Healthy rabbits groom themselves, and beyond an occasional rub down with a selvyt, a piece of velvet, or a silk handkerchief, the coats of most breeds are best left alone. Some fanciers believe in rubbing a drop of paraffin oil on the palms of the hands and then smoothing the coat; and, if skilfully done, this may give an added gloss to short-coated breeds. It must, however, be grasped by the novice that none of these "tricks," if such they may be called, turn a bad rabbit into a good one or have any appreciable influence except in the very keenest competition in the unlikely event of two specimens being so near together in merit that it is almost impossible to separate them.

The cause of most novices failing to win is want of knowledge of the "points which matter." It is often difficult for the inexperienced to pick out the most likely show rabbit in his stud; occasionally it may happen that the specimen which would have won is left at home. The moral is not to hastily blame the judge when an exhibit comes home cardless, but to get to shows if possible, see what wins, study the breed, learn to criticise the home-bred stock, and then try again. After considerable experience in exhibiting many classes of stock the present writer can testify to the fact that at the large shows the best animals usually carry off the prize money. There may be a difference of opinion between judges as to the precise merits of an exhibit, for few animals are faultless, and one judge may penalise a certain fault more than another. But, taking it all round, a good rabbit is seldom totally overlooked, and exhibitors can take it for granted that when their animal comes home without an award, it is more likely to be due to an error of judgment on their own part in considering it fit to win than to an error on the part of the judge.

In any case it is etiquette in the fancy to take the ups and downs of exhibiting in good part; the breeder who publicly grumbles and blames the judge soon becomes known as a bad sportsman.

Exhibiting is not as a rule directly profitable. Although the prizes at the big rabbit shows are on a relatively more liberal scale than among many other classes of livestock, a second prize will generally only just cover the expenses of entering and sending, and thirds and "cards," as commendations are called, are sheer loss. One does not therefore go in for exhibiting with the idea of making money out of it, for nothing short of a first for every exhibit will do this; but indirect profit is gained by the enhanced prices which can be obtained for all specimens which have received favourable notice; and the fact of entering decent stock at the best shows is in itself some sort of advertisement for the rabbitry. If the exhibition account balances at the end of the year, the breeder is not doing very badly at the game. In the rabbit fancy a man may have the best specimens of a breed in the country, yet no one will know it, and he will get nothing like their value for them if he keeps them at home. On the other hand, if he exhibits, wins, and his stock is well reported on, he will have no difficulty in disposing of his winners on the strength of the judge's show report, and much other stock of the same strain besides, hence troublesome as the process is, it is worth while to occasionally send to the best shows, even if a regular practice is not made of exhibiting.

On the Continent classes are given at two or three good shows in the autumn every year for the flesh and fur breeds, which are judged for their flesh-carrying shape, and the suitability of their coats for economic purposes, and there is no reason why rabbits should not be judged on similar lines in these Islands, thus helping to combine exhibition and utility properties in the same animal.

The process of exhibiting is fairly simple. Schedules are published, either as separate circulars or in the fancy press in the form of an advertisement, from which entries have to be made by a specified date. The next event is the receipt of labels bearing the pen numbers of the exhibits. The owner's name and address has to be written on the back of each label for the return journey. The labels are tied (not nailed) on to the boxes or baskets, and it is a good plan to repeat the pen numbers and give a description of the variety, sex, and colour of each animal on a card which is fixed to the inside of the lids of the travelling-boxes. This may save a mistake when the animals are repacked.

SHOW BOXES AND BASKETS

Show boxes or baskets must be properly hinged, provided with a comfortable carrying handle, and a foolproof fastener such as a strap and buckle. Baskets jar the inmates less than boxes; but they should be lined with American cloth or several layers of paper covered with sacking, or they will be too cold and draughty for winter use. It is especially important to have a solid wood or waterproof lid if the top of the basket or box is flat, otherwise the inmates may get wet if another basket is put on top in the course of the journey. As several animals travel more cheaply in one package, it is usual to have two, three, or more compartment boxes or baskets. Adequate ventilation must be provided. It is far better to give too much than too little, as many rabbits have lost their lives in a stuffy, crowded van owing to inattention to this detail. A hole 4 inches in diameter, covered with perforated zinc, is desirable for each rabbit. Again, rabbits have lost a prize owing to lameness due to cramp from travelling in too small a hamper. Suitable dimensions for rabbits of up to about 6 lbs. weight are 16 to 18 inches long, 10 inches wide, 11 inches high. Long-legged and large breeds require much more space than this. It is not only cruel, but bad policy to try and save a few pence in carriage by scamping the travelling packages.

Prior to despatch sawdust should be put in the bottom of each compartment, a layer of the best quality hay above this, and finally a piece of swede, apple, or some greenstuff for the animal to eat *en route.*

Rabbits usually go unaccompanied to shows. The officials see to the penning, feeding, and actual exhibiting before the judge, and pack and return the stock at the end of the show. It is unusual for anything to go amiss at the large and well-managed shows. The prize money is sent by post a week or two later.

Upon their return from a show rabbits require an immediate drink of water, plenty of succulent and easily digested green food, of which they have probably been deprived during their absence from home, and a good rest. In a few hours they are usually very little the worse for their outing; but young rabbits should not be shown frequently, as they lose weight and get a set-back from the excitement and knocking about they receive.

CHAPTER XIV

PROFITABLE METHODS AND RABBIT FARMS

THE production of natural fur obviously entails the keeping of pure breeds of rabbits, and the greater the uniformity of the strain, the larger will be the number of closely matching pelts it will be possible to produce. Therefore the main object of the breeder for fur is to eliminate variation.

The production of table rabbits does not of course necessitate the keeping of pure breeds; indeed certain first crosses result in rabbits which fulfil all the requirements of the breeder quite as well as any pure breed. The breeder of cross-breds, has, however, but the one market—the meat market—for his produce, whereas if he keeps a pure breed he will probably find a ready sale for much of his best stock for exhibition and breeding purposes at prices far in advance of their value in the meat market.

The profit on pure-bred rabbits sold for stock will therefore be much greater than the profit derived from those sold for their flesh, although the food bill, labour, etc., will be very much the same in either case. There is very little doubt that it will pay the average rabbit-breeder much better to keep pure breeds than cross-breds. The chief difference lies in the capital required at the start. Those who have only a small amount to spend on stock will have to be content with animals suitable for cross-breeding, and their returns, as is only to be expected, will be on a proportionately modest scale. The capitalist, however, the man who can afford to lay out a few pounds on equipment and stock, should certainly specialise in one or other of the flesh and fur breeds. Upon these varieties the future success of rabbit breeding as an industry depends; there will always be a demand for specimens bred on the right lines—*e.g.* flesh-carrying carcases and good natural fur—and the very best individuals bred will have an exhibition value as well.

Many people who have made a success of rabbit breeding on a small scale desire to extend their enterprise. There are others who, knowing nothing of the subject, but hearing of the success of their friends, contemplate putting an amount of capital varying from £100 to £1,000 into a "rabbit farm" with the idea of making a "living." It may therefore be of interest to endeavour to ascertain what prospects these optimistic experimenters have of success.

Certain French authors have described methods and published balance sheets showing enormous profits to be derived from the breeding of rabbits either for their flesh, their wool, or their fur. Unfortunately, however, the theories advanced are not beyond criticism. The success of a rabbit farm will depend mainly upon three things: (1) the number of young reared annually to a profitable age per doe, (2) the freedom from losses of stock from disease, (3) the ability to secure cheap and efficient labour. French authors put the number of young born as from 24 to 30 per doe from 100 does, *all* these are reckoned to be reared to a profitable age, every doe is estimated to breed with regularity, and, in fact, the whole scheme is evolved *on paper* with a mathematical exactitude which is impossible of attainment in practice when dealing with living creatures. Every man who has had any real experience of breeding animals, and rabbits in particular, will know that he is extremely unlikely to produce 3,000 young ones in a year from 10 bucks and 100 does without a proportion of losses of either breeding stock or youngsters, and unless he can rely upon doing this or the equivalent, the scheme propounded collapses and the estimated profits vanish!

It may be taken for granted that large utility rabbit farms are not likely to succeed; the mere fact of innumerable rabbits concentrated on a small area of ground will assist in the rapid spread of disease, and many other troubles are likely to crop up and prevent success which it is unnecessary to specify here. The labour which will be required to maintain that high state of cleanliness which is absolutely essential if disease and ill-health are to be avoided will alone be likely to swamp all the profits of a utility rabbit farm in England. This enterprise is not of a nature which allows of heavy labour bills; much of the light work must be done by members of the family and other unpaid and willing workers if success is to be assured.

On the Continent utility rabbit breeding is essentially an industry in the hands of the peasants and small farmers. Two or three does are kept by almost every householder, and their young are sold at weaning time to rearers who run them in large pens and prepare them for the market. It is upon these lines that utility rabbit breeding has been found by experience to succeed best; it is considered on the whole to be a mistake for one individual to attempt the breeding, rearing, and fattening of table rabbits on a large scale.

The Continental so-called rabbit farms, where pure varieties are bred for the combined purpose of exhibition and the supply of pure-bred breeding stock, are usually establishments where fowls, goats, and other classes of small livestock are also produced for sale. As far as the present writer knows, there is no French breeder who makes a living out of rabbits alone; but there are numbers of persons of both sexes who specialise in several breeds of flesh and fur rabbits, and several with establishments where rabbits and fowls of many pure breeds are bred, and their appliances, foods, etc., are manufactured. In other words, people of independent means often make a speciality of rabbit breeding, while those with a living to make frequently include rabbits as one of many branches of a somewhat similar class of enterprise.

Before investing capital in a rabbit farm, then, the English enthusiast will be well advised to think over and if possible study on the spot the methods of rabbit keeping which have been evolved as the result of experience by our practical Continental neighbours.

There is not the slightest doubt that an intelligently managed rabbitry, comprising specimens of the pure flesh and fur breeds, will yield a relatively handsome rate of interest (but not a "living") if a start is made in a small way, and the business is worked up gradually as experience is gained and success justifies expansion; but this is a different matter to investing a big capital in starting such a concern in a large way. It often seems to be forgotten that rabbit keeping on a serious scale requires as much knowledge and training as any other trade or industry, and even when the requisite experience has been gained there is always the spectre of disease lurking in the background wherever big stocks of one species of animal are kept.

The breeder who can turn out an occasional winner among the flesh and fur breeds at one of the big shows, thereby proving the superiority of the shape and of the fur of specimens from his stud, or who can earn a name for possessing a strain of Giants of over 20 lbs. weight, or who can in some other way lay claim to distinction in the rabbit world, is certain of the financial success of his undertaking if he works on moderate lines and has sufficient business acumen to limit his undertaking to the most profitable point.

CHAPTER XV

COOKING RABBITS

RABBITS which have been receiving drugs or patent curatives in their food should not be killed for table purposes unless the medicines have been withheld for a sufficient time (several weeks) to enable the system to almost totally clear itself.

Rabbits should be disembowelled immediately they are killed. It is usual to leave the liver in the carcase; but if the liver is covered with white spots, it must be taken out and burnt together with the intestines. As many wild rabbits are found when killed to have slightly diseased livers and intestines and are used for edible purposes, there is apparently no objection to using the cooked flesh. If the animal has been ill and died, however, of this or any other complaint, the flesh should not of course be used.

Rabbits when cleaned can, if the fur is of no special value, be "hung" in the skins for about the same length of time as chickens in similar weather. It is usual on farms where wild rabbits are shot to eat them as fresh as possible.

The following figures, given by Mrs. Beeton, show the loss incurred by cooking an ordinary wild rabbit:

Weight of paunched rabbit.	Weight of bone, skin, and waste.	Loss by cooking.	Edible matter.
1 lb. 8 ozs.	6½ ozs.	4 ozs.	13½ ozs.

TO TRUSS A RABBIT FOR ROASTING AND BOILING

Empty, skin, and wash the rabbit thoroughly; take out the eyes, wipe it dry, put in stuffing (if liked), and sew it up.

Then cut off the forefeet and hind ones nearly up to the hocks, bring the forelegs backwards and the hind ones forward until they overlap close alongside the ribs, and run a skewer through them and the body so as to keep the four legs drawn up in position close to the sides of the ribs.

Finally raise the head and skewer it back between the shoulders.

For boiling proceed as above, but bring the head round to the left side and run the skewer through it as well as through the legs and body.

BOILED RABBIT

Choose a young animal.

Let it soak for a quarter of an hour in warm water to draw out the blood; then truss. Put the carcase into sufficient hot water to cover it, and let it boil very gently for from half to three-quarters of an hour according to age and size.

Dish with either onion, mushroom, or liver sauce or parsley-butter, the first-named being usually preferred.

ROAST OR BAKED RABBIT

Prepare rabbit as already described, stuffing with sausage-meat.

Wrap the rabbit in buttered paper, and roast for from 35 minutes to ¾ of an hour before a hot clear fire. Keep it well basted, and a few minutes before it is done remove the paper, flour the carcase, and let it acquire a nice brown colour. Take out the skewers, and serve with brown gravy and red currant jelly.

Or bake in a hot oven.

STEWED RABBIT

Cut the rabbit into small joints, put them in a stewpan, add 2 large onions, 6 cloves, and 1 small teaspoonful of minced lemon peel. Pour in sufficient water to cover the meat, and in from about ½ to ¾ of an hour when the rabbit is nearly done drop in a few forcemeat balls. Thicken the gravy with flour and butter, put in 1 large teaspoonful of mushroom ketchup, give one boil, and serve.

As a change cut the rabbit into quarters, lard them with strips of bacon, and fry them; then put them into a stewpan with rather more than 1 pint of good stock, savoury herbs, salt and pepper, and simmer gently for half an hour. Thicken the gravy with butter and flour, add 1 glass of sherry, give one boil, and pour it over the rabbit.

RABBIT PIE

Cut up a young rabbit, remove the breast bone and bone of the legs. Put the rabbit, together with slices of ham or bacon, forcemeat balls, and sliced hard-boiled eggs, by turns in layers in a pie-dish, and season each layer with pepper and salt, pounded mace, and grated nutmeg. Add ½ pint of water, cover with pie-crust, and bake in an oven for about 1½ hours. When done, pour in a little good gravy through the hole in the middle of the pie-crust.

In place of forcemeat balls ¼ lb. of good cheese grated is a pleasant addition to the pie.

FRIED RABBIT

Cut the rabbit into neat joints, flour them well, or brush them over with egg and sprinkle with breadcrumbs, and fry a nice brown in boiling dripping. Serve by arranging the rabbit pyramidically on a hot dish over a mixture made of 1 teaspoonful of minced shallot, 1 oz. butter, 2 tablespoonfuls mushroom ketchup.

HOT-POT OF RABBIT

Remove all bone easily detached. At the bottom of a deep pie-dish lay a layer of thick slices of potato, on top place part of the rabbit, and season with pepper and salt and some finely chopped bacon and onion. Repeat layers of potato and rabbit until all is used. Cover with halved potatoes and nearly fill the dish with seasoned water. Cover pie-dish with an inverted dish, and bake slowly for two hours.

Another method is to dip each joint in flour, and fry until lightly coloured. Fry some finely chopped onion, place it at the bottom of a deep dish, arrange the rabbit on this, pour over 1½ pints of good stock, sprinkle in ½ oz. pearl barley, oatmeal, or rice, add 2 cloves, 2 bay leaves, pepper and salt. Simmer gently in the oven for two hours.

RABBIT "EN CASSEROLE"

Wash and joint a rabbit, and dry the pieces thoroughly by leaving them in a dry cloth, then dip them in seasoned flour or fine oatmeal. Have ready in a casserole a layer of hot fat, in it fry the rabbit and a teaspoonful of chopped onion until the flesh becomes firm, then drain off the fat. Add 2 carrots and a turnip cut into slices, season to taste, and cover with the water in which the liver and kidneys have been simmered for an hour. Cover closely, and cook in moderate oven for forty minutes. While the rabbit is cooking, take 6 ozs. flour, 3 ozs. suet, a half-teaspoonful of salt, and a teaspoonful of baking-powder. Mix to a stiff paste, roll out to the shape of the casserole, and at the end of forty minutes place it on top of the contents of the casserole in place of the lid. Return to the oven and bake for another forty minutes.

FRICASSEE OF RABBIT

Wash, joint, and dry the rabbit, dip the pieces in seasoned flour, and fry lightly in a stewpan. Pour off any remaining fat, cover the rabbit with good stock or meat extract, and cook very gently for one hour. Then add ½ lb. to 1 lb. peeled mushrooms, season generously, and cook gently for another hour. In a small saucepan mix one tablespoonful of flour with a little butter, keep it by the side of the fire until the mushrooms are fully cooked, then mix it with the liquid in the stewpan. Stir and boil till smooth, season if necessary, and mix gently with rabbit and mushroom.

RABBIT IN BATTER

Prepare rabbit by washing and jointing and remove as much bone as possible. Put the bits into warm salted water and cook very gently till nearly done, then drain well and place the pieces lightly in a pie-dish, baking-dish, or tin, with a seasoning of pepper and salt. Put 8 ozs.

flour into a basin, with half a teaspoonful of salt. Beat in 2 eggs and stir in smoothly and by degrees 1 pint of milk. Pour the mixture over the rabbit, and bake in a moderate oven for one hour.

RABBIT BRAWN

Gently stew a rabbit until the flesh begins to fall away, then remove the flesh from the bones, mince it, and pound it until it becomes a smooth paste. Add up to 4 ozs. of ham or bacon while chopping, also pounded mace, grated nutmeg, salt and pepper.

When ready, mix in 1 dessertspoonful of cornflour and add ½ pint of a good jelly stock, or, failing a jelly stock, dissolve 3 ozs. gelatine in ½ pint warm stock, add the pounded rabbit to this, stir it over the fire for a few minutes until it has thickened, and turn it into a mould to set for use when cold.

POTTED RABBIT AND HAM

Prepare as for brawn, but instead of adding cornflour, stock, etc., press the pounded and seasoned meat into small jars and run a little melted mutton fat on top.

CHAPTER XVI

COMMON COMPLAINTS

HEALTHY rabbits adequately and correctly fed and watered so as to maintain a "good" as opposed to an unduly fat or thin condition, are bright of eye, sleek of coat, and always ready to eat.

If a rabbit remains crouching in a corner, has a dull and sunken eye, loses its appetite, and seems generally quiet, it may be supposed that it is unwell.

In a healthy rabbit the normal heart beats are 120 to the minute.

The normal excreta from the bowels are in the form of hard round pellets, a good deal larger in size in Giant races than in medium-sized breeds. Constipation is indicated when the pellets are very small for the breed, and when this state arises from a temporary disorganisation of the digestive system, it is usually followed in a day or two by a little looseness, which is a natural effort to rid the system of the cause of the trouble and does not need doctoring but merely careful dieting with easily digested food.

Generally speaking, more young rabbits probably die from parasitical invasions than from any other cause. The commonest parasites or their germs are usually conveyed to the victims, it is believed, (1) by means of unsound green food, by which is meant stuff which is mouldy, blighted, soiled in some way such as by other animals, poultry, etc.; (2) among greenstuff grown in shady, damp places; or (3) on green food which has been manured with the cleanings from hutches tenanted by diseased rabbits. The grass, etc., given to rabbits should always be cut in dry, sunny spots, rather than in damp places where it is probably rank and abundant.

It is highly likely, however, that young rabbits will not become seriously if at all invaded by the parasites they ingest if they are in robust health and condition as the result of receiving a well-balanced ration containing the ingredients they need.

External parasitical complaints, such as ringworm, mange, and canker of the ear are only " caught " by actual contact with diseased rabbits or the undisinfected hutches and utensils which have been used by them.

Dirty hutches (cleaned out at infrequent intervals instead of daily) are responsible for inflamed eyes, sore hocks, and probably vent disease.

Such conditions as " fits " and paralysis are symptoms rather than diseases, the former arising more often than not from digestive disorder, and the latter from poisons affecting the nervous system, or an injury.

Care of Sick Rabbits

Rabbits which are out of health should be isolated in a warm sunny hutch and fed on abundant easily digested food. The breeder of utility rabbits is strongly advised not to attempt the cure of constitutional complaints such as colds, snuffles, etc., but to kill the affected animals at once, disinfect the hutches and utensils, and make a fresh start. Flesh and fur rabbits are no good to any one unless they are hardy ; the predisposition to catch cold easily is undoubtedly hereditary ; therefore it is most unwise to cure the animal and then consider that it is fit to breed from. This course simply means laying up a crop of future troubles, and it is by far the wisest policy to adopt the principle of never keeping for breeding purposes any rabbit which has ever ailed anything of a constitutional nature.

Complaints due to parasites or insanitary conditions are not, of course, hereditary.

Post-Mortem Examinations

The breeder must make a practice of opening all rabbits which die, as in this way only can an epidemic be checked, or the cause of the mortality be removed.

The disposal of the carcases of diseased rabbits which die is a very important matter. If thrown on a rubbish heap they may be carried about by dogs and cats, to say nothing of the attraction afforded to flies ; while if buried, the soil affords an environment which preserves the vitality of the disease germs, and these are ever liable to be brought to the surface by earthworms, moles, and insects, to start the trouble anew if by chance they get conveyed on food to rabbits.

Diseased carcases must therefore be burnt, a good fire of paper and sticks made on the ground usually doing what is necessary in the absence of an available stove, grate, or incinerator.

ADMINISTERING MEDICINES

The formation of the mouth makes it a very difficult matter to dose a rabbit with liquid. The best appliance is one of the pipettes with bone or metal nozzles sold by surgical makers. The dose is measured and put into the instrument, the rabbit is wrapped in a sack or strong cloth, the head is raised, and the nozzle inserted at the corner of the mouth. The instrument is gently squeezed to force the liquid very slowly down the throat. At the least sign of coughing or choking the rabbit's head should be temporarily let down.

Such alternatives as sulphate of magnesia (Epsom salts), linseed oil, and vermifuges can be given in a little food if the patient has not lost appetite.

As it is neither desirable nor an economically sound policy to keep delicate specimens of the flesh and fur breeds or individuals which constantly require medical treatment, the commonest complaints only will be dealt with, and these, moreover, briefly. Could a rabbit choose its own food and environment, it would probably never be ill at all; nine-tenths of its troubles are due to its mismanagement by its owner.

CANKER OF THE EAR

Cause.—A parasite (*Psoroptes cuniculi*), which takes up its abode in the ear and may ultimately cause death from irritation if neglected.

Symptoms.—Matter, dried wax, etc., visible in the ears. The rabbit scratches at them and shakes the head, and shows evidence of pain if handled by the ears.

Treatment.—Have the following prescription made up:

Glycerine . . .	100	grammes
Crystallised carbolic acid	2	,,
Oil of Turpentine . .	1	,,
Laudanum . . .	1	,,

Paint the interior of the ears with a camel's-hair brush and a few drops of the above once daily for five consecutive days, scooping out before applying the dressing as much of the debris and matter as possible with wads of cotton-wool tied to a skewer. Repeat dressing after an interval of five days, and again in five days, if a cure is not already affected. If properly carried out, this treatment is a specific for the complaint. The parasite which causes canker of the ears is believed to cause a form of mange in horses and to be transferable between the two species.

COCCODIOSIS

Cause.—A minute parasite (*Coccidium cuniculi*) belonging to the order Protozoa, which in the aggregate appear to the eye as white spots or lumps on the liver, or greyish-white areas of disorganisation in the intestines, and is believed to be ingested with damp food. Chiefly attacks young rabbits.

Symptoms.—In the intestinal form there is diarrhœa and a gradual wasting away. The manure from such rabbits is full of parasites, and should always be burnt. Rabbits suffering from an invasion of the liver only (" liver disease ") show less obvious external signs except that of a gradual unthriftiness. Often both parts of the body are affected at the same time.

If after death a young rabbit is found to have died of this disease, all the other young animals in the stud which have been receiving similar food and treatment and may therefore have been exposed to similar infection should be isolated, should receive plenty of dry food of a very nourishing and stimulating character, and should be given to drink for ten days in place of water some of the ale-coloured liquid made by dissolving 15 grains of crude catechu in one gallon of water. At the end of this period give daily for a further ten days 5 grains per head of sulpho-carbolate of soda mixed in the concentrated food.

Kill any rabbits which are obviously ill, and burn the diseased organs.

COLD

Cause.—So-called colds seem to be complex in nature, and may be induced by (1) chills caught on railway journeys,

(2) keeping hutches on cold and damp soils, (3) as the result of infection from a rabbit already suffering from a complaint of this nature (see Snuffles), (4) as the result of parasitical invasion of the nose, (5) from dust. The actual sneezing often seems to be induced by the irritation of dust on an already disorganised mucous membrane.

Symptoms.—Sneezing and running at the nose.

Treatment.—Keep the animal warm, feed liberally, and give twice daily eight drops of sweet spirit of nitre in a little milk or water. Painting the inside of the hutch with paraffin oil is said to sometimes help the cure of an obstinate cold; or bits of naphthalene put into perforated tins and kept in the hutch; or eucalyptus oil, a few drops on a ball of hay kept in the hutch.

COLD IN THE EYES

Cause.—Exposure to a draught or cold wind.

Symptoms.—Water running from the eyes.

Treatment.—Bathe with a lotion composed of boracic acid 1 scruple, water 6 ozs.

COLIC

Cause.—Errors in dietary.

Symptoms.—The rabbit sits hunched up and evidently suffers from internal pains accompanied often by flatulence or constipation.

Treatment.—For flatulence give 3 to 5 drops of oil of turpentine (bought from a chemist) in 1 teaspoonful of linseed oil. If there is slight disorder without flatulence, give the linseed oil alone.

CONSTIPATION

Cause.—Errors of dietary.

Symptoms.—Small pellets or absence of excrement.

Treatment.—Give food of an easily digested and more laxative nature and water to drink. Feed lightly at first and gradually increase the quantity. If the trouble is due to a too sudden change of food, the remedy is obvious. Half a teaspoonful of linseed oil mixed with the concentrated food, or in slight cases the same amount of whole linseed, may put things right without further doctoring. Fanciers recommend: Half-teaspoonful doses of syrup of buckthorn once daily; a dose of five to ten drops of tincture of rhubarb; Glauber's salts, twelve drachms dissolved in one pint of water, the dose being two tablespoonfuls given twice daily in food.

DIARRHŒA

Cause.—Errors in dietary or a parasitical invasion.

Symptoms.—Loose and watery evacuations which soil the fur and smell sour and offensive.

Treatment.—Change the food and place the rabbit in a clean, dry, and warm hutch. If a more careful attention to securing clean, wholesome, and varied food and fresh drinking water does not bring about an improvement in the course of a few days, either severe poisoning, inflammation, or parasites may be suspected. Diarrhœa being a symptom of many diseases, not a disease in itself, is difficult to prescribe for. If it is merely due to a temporary digestive disturbance, a dose of linseed oil and more careful feeding should put matters right; if it is diagnosed as due to parasitical invasion, the animal should be treated accordingly. (See Coccodiosis.)

EYE, COLD IN (*which see*)

EXTERNAL PARASITES

These include fleas, lice, and various minute creatures visible as small specks among the fur.

Fleas breed in dusty cracks and corners, and it is necessary to thoroughly disinfect and cleanse the outhouse, hutches, and appliances if a complete extermination is desired. Fleas are not in the present writer's experience at all common on ordinary well-kept rabbits.

Lice are much more troublesome, as they breed on the rabbit by gluing their eggs or "nits" to the fur, and it is necessary to give repeated dressings with vinegar or methylated spirit or a 5% aqueous solution of creolin at five-day intervals to destroy the newly hatched parasites and the vitality of the eggs.

Dustings of any good insect powder will destroy the smaller parasites.

FITS

In young rabbits these are usually the symptom of acute indigestion or accompany some fatal parasitical complaint, or are a sign of acute poisoning.

Give an aperient and change the dietary.

MANGE

Cause.—A parasite (*Sarcoptes cuniculi*) invisible to the naked eye, which burrows into the skin and forms galleries covered by crusts. Contact with diseased rabbits or undisinfected hutches is the cause.

Symptoms.—Scabies commences on the nose, and is confined to the lips, forehead, and legs. The rabbits suffer intense irritation and scratch and rub themselves. The fur falls off and thick white or greyish crusts appear.

Treatment.—Apply a thick dressing of soft soap, and hold the rabbit for about 20 minutes. Then wash this off with warm water and apply sulphur ointment (sulphur 1 part, lard or vaseline 3 parts) well rubbed in. Repeat the dressing twice daily. In five days apply soft soap again, and repeat dressing until cured. The operator should wash his hands after dressing the rabbit to prevent personal infection and transmission to healthy animals.

Hutches which have housed mangey rabbits must be thoroughly disinfected.

POT BELLY

A symptom of acute indigestion due to incorrect feeding or parasitical invasion and cured by removing the cause.

RINGWORM

Cause.—A fungoid growth arising from contact with animals similarly affected or their utensils.

Symptoms.—Circular, flattened, yellowish crusts varying in size up to a sixpenny piece, confined to the head, ears, and paws, peculiar to young rabbits and liable to die out in time spontaneously if untreated.

Treatment.—Paint with tincture of iodine, or apply sulphur ointment (1 part sulphur, 3 parts lard).

RICKETS

Crooked forelegs, either bent forearms or weak joints and turned-out feet, are due to a dietry containing insufficient lime, also to insufficient exposure to light, and although when once established they cannot be cured, they are easily prevented by adding lime in some form to a dietary which lacks a sufficiency of this ingredient, and letting more light and sun into the rabbitry.

SNUFFLES

Cause.—A microbe (bacillus), the source of which or cause of infection is often difficult to account for, but the disease is usually transferred from one rabbit to another.

Symptoms.—Sneezing, snuffling, running at the nose, the discharge in advanced cases matting the fur on the insides of the forelegs.

Treatment.—A number of remedies have been suggested, but the disease is so deep-seated that a cure is difficult. The present writer has tried most of the internal and external remedies or "cures" advocated by fanciers, and has never yet found one which is successful in doing what is claimed for it. As a predisposition to this complaint seems to be hereditary (for one or two rabbits of the same breed and strain may "catch cold" or start sneezing while in a pen with others of different breeds and strains which remain perfectly well), the only certain way to stamp out this troublesome disease is to fatten and kill all specimens which show the least symptoms.

SWOLLEN TEATS

Rub with camphorated oil and temporarily reduce the proportion of albuminoids in the dietary.

VENT DISEASE

Cause.—Probably the most frequent cause is dirty hutches. Such cases as have come under notice have all been in rabbits sent by other breeders; the complaint is at present unknown among rabbits in hutches which are cleaned out daily. If rabbits have to squat, as is their habit, in insanitary corners on fermenting manure which has accumulated for perhaps a week, it is hardly surprising if the genital organs become inflamed and disorganised.

Symptoms.—An inflamed and swollen appearance of the external genital organs, often accompanied by yellowish scabs, which are one of the external symptoms of the disorganisation within.

Treatment.—Syringe the vagina daily for a few days with a 3% sulphate of zinc lotion. This will probably cause an immediate improvement and a rapid cure. Does with this complaint will frequently mate at any time, but are usually barren, and it is no good mating them and expecting fertility until a cure has been affected for three weeks. In the writer's experience this complaint is not infectious.

WORMS

Rabbits are frequently, indeed usually, the hosts of small harmless bowel worms (*Oxyuris ambigua*) ; but it is uncommon to find hutch-bred rabbits harbouring other and more serious species.

Treatment.—A useful vermifuge for a rabbit is : 7 grains areca nut, 1 grain santonin. An hour later give 1 teaspoonful of olive oil.

WOUNDS

Most tears and bites in the skins of rabbits cure themselves if washed with disinfectant and smeared with carbolised vaseline or some other disinfecting ointment. A bad tear may need a stitch, which in the absence of the proper silk thread or prepared catgut and a surgical needle, can be put in with an ordinary fine needle and white cotton, sterilised by boiling and then greased with antiseptic ointment. Each stitch must be boldly put well into the skin away from the edge of the tear, the needle unthreaded, the two ends of the cotton drawn together until the edges of the wound just meet, and the cotton then tied and the ends cut off. The wound should be dressed twice daily with antiseptic ointment, and on the third day the stitch must be cut with a pair of scissors and drawn out. Healthy wounds require nothing further than perhaps dressings with antiseptic ointment, and if proud flesh forms, a pinch of iodoform dusted on.

SULPHUR DISINFECTION

After an outbreak of disease thoroughly wet the insides of the hutches which have been occupied by the invalids, make them as air-tight as possible, and burn sulphur in them. Sulphur at the rate of 2 ozs. to each cubic yard of space should be put into a little saucer or tin and set alight to and allowed to burn until totally consumed.

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